

A Review of the Alaska Interagency Electronic Reporting System (IERS) with an Emphasis on Costs and Benefits to Stakeholders

Prepared for

NMFS Alaska Regional Office

Contract Number: WE-133F-14-SE-4069

and

Alaska Department of Fish and Game

September 7, 2015



Prepared by



**Northern
Economics**

In association with

**Darrell Brannan,
Independent Fisheries Consultant**

17307 SE CR 234
Micanopy, FL 32667
Phone: (352) 562-4388
Email: darrell65@gmail.com

880 H Street, Suite 210
Anchorage, Alaska 99501
Phone: (907) 274-5600
Fax: (907) 274-5601
Email: mail@norecon.com

1455 NW Leary Way, Suite 400
Seattle, WA 98107
Phone: (907) 274-5600
Fax: (907) 274-5601

PROFESSIONAL CONSULTING SERVICES IN APPLIED ECONOMIC ANALYSIS

Principals:

Patrick Burden, M.S. – Chairman
Marcus L. Hartley, M.S. – President
Jonathan King, M.S. – Vice President
Michael Fisher, MBA – Principal
Diane Steele – Office Manager

Consultants:

Leah Cuyno, Ph.D. Don Schug, Ph.D.
Gary Eaton, M.S. David Weiss, M.S.
Michelle Humphrey, B.S. Katharine Wellman, Ph.D.
Cal Kerr, MBA

Administrative Staff:

Terri McCoy, B.A. – Editor



880 H Street, Suite 210
Anchorage, Alaska 99501
Phone: 907.274-5600
Fax: 907.274-5601

1455 NW Leary Way, Suite 400
Seattle, WA 98107
Phone: 206.747.8475
Email: mail@norecon.com

Preparers

Team Member	Project Role/Affiliation
Darrell Brannan	Primary Author and Investigator
Marcus Hartley	Project Manager and Co-author
Hannah Foreman	Research Analyst
Terri McCoy	Technical Editor
With Significant Input from	
Jennifer Mondragon	NMFS-Alaska Region
Gail Smith	ADF&G

Please cite as: Northern Economics, Inc. *A Review of the Alaska Interagency Electronic Reporting System (IERS) with an Emphasis on Costs and Benefits to Stakeholders*. Prepared for NMFS Alaska Regional Office and Alaska Department of Fish and Game. September 7, 2015.

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Abbreviations

ABC	Allowable Biological Catch
ADF&G	Alaska Department of Fish and Game
AFA	American Fisheries Act
AKFIN	Alaska Fishery Information Network
BSAI	Bering Sea/Aleutian Islands
CBA	Cost/benefits analysis
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
COAR	Commercial Operator Annual Report
CPUE	Catch per unit effort
CR	Crab Rationalization
DCPL	Daily Cumulative Production Log
DPR	Daily Production Report
DSR	Demersal Shelf Rockfish
EEZ	Exclusive Economic Zone
ER	Electronic reporting
FMP	Fisheries Management Plan
FTE	Full-time equivalent
GCI	General Communication Inc.
IERS	Interagency Electronic Reporting System
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
LRS	Legacy Reporting System
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NPFMC	North Pacific Fishery Management Council
OLE	NMFS Office for Law Enforcement
OMB	U.S. Office of Management and Budget
PRA	Paperwork Reduction Act
PSC	Prohibited Species Catch
WPR	Weekly Production Report

1 Introduction

The Interagency Electronic Reporting System (IERS) is a fisheries data collection system that supports the management of commercial fisheries off Alaska and is supported through a partnership among National Marine Fisheries Service (NMFS), Alaska Department of Fish and Game (ADF&G), and the International Pacific Halibut Commission (IPHC). Development of the IERS began in 2001 and it has been implemented in stages starting in 2005. The IERS continues to grow and expand in terms of the number of fisheries in which the program is used, and in terms of the data instruments that have been incorporated into the system. The following statistics provide an indication of activity in the IERS from 2005 through May 2015:

- Landing Report Count: 443,895
- IFQ Report Count: 96,554
- Production Report Count: 214,284
- eLogbook Report Count: 246
- Agency User Count: 388
- Processor User Count: 2,228

This document will describe both the IERS as well as the “legacy” systems that it replaced. It will also provide a qualitative description and summary of the costs and benefits that were realized through the implementation of the IERS as well as areas where stakeholders feel IERS or regulations that guide the program’s structure could be improved.

The remainder of this introduction describes the project objectives and the methodology used. Section 2 provides background information on the legacy data collection systems and on the IERS itself. Section 3 provides a broad thematic summary of the findings regarding the costs and benefits of the IERS, while Section 4 summarizes the project’s findings with respect to the original goals and objectives of the IERS program from 2001. Three appendices are also included: Appendix A and B are the questions used in key informant interviews of industry members and agency staff, respectively. Appendix C is fairly lengthy and provides relatively detailed accounts of the information gathered from each of the 11 stakeholder groups included in the analysis.

1.1 Project Objectives

The primary goal of this NMFS-funded project is to quantify the costs and benefits of moving from the legacy reporting system to the IERS in Alaska. By quantifying the costs and benefits, it is hoped that both the state and federal governments can assess the returns on their investments in the IERS. Further, it is believed that the Alaska experience will provide other states and regions with valuable insights as they contemplate similar transitions.

Limited work has been done to describe and estimate the costs and benefits of electronic reporting systems in Alaska or elsewhere. However, A NMFS workgroup published a white paper on both electronic reporting (ER) and electronic monitoring provided some initial insights. (NOAA Fisheries Office of Policy & Electronic Monitoring Working Group, 2013). The group’s general findings were that ER is effective at capturing fishery-dependent data. However, since data are self-reported, it is still possible to submit incorrect information either intentionally or unintentionally, which justifies additional data collection efforts, such as fisheries observers, logbooks, Vessel Monitoring Systems (VMS), and vessel operator interviews. Unintentional misreporting of data can be mitigated through

development and deployment of business rules that notify the submitter of data entry errors at the time data are entered. The report also indicated that cost variations of ER systems in different regions of the country can be generally attributed to the novelty and complexity of the system. More complex reporting systems generally have higher initial development costs, but those costs may be decreased in other regions if the system developed can be easily implemented in that area. The report also stated that for the program to remain successful, systems require ongoing funding for operations, maintenance, and data quality reviews.

The above discussion takes a nationwide view of ER. This paper focuses primarily on the Alaska Region and the IERS that has been implemented. Based on the 2013 white paper findings, the knowledge developed from implementing the Alaska IERS program could be utilized to reduce the costs other regions would incur when developing an interagency ER program.

While the stated goal of the project is to develop a fully quantitative cost/benefits analysis (CBA) of the transition to the IERS, many factors contribute to the reality that a fully quantitative CBA of the Alaska IERS is simply not possible. There are three primary reasons for this conclusion:

- 1) Baseline operating costs of the legacy data reporting systems were not quantified prior to development and implementation of the IERS, and given that more than 10 years have passed since the IERS was first conceived, a comparison of operating costs before and after implementation could never be precise.
- 2) Because the costs and benefits of fishery data reporting systems are incurred and realized by both the agencies and the fishing and processing industries, a fully quantitative CBA would necessitate a comprehensive survey of industry participants. Such a survey would be very costly, and would require approval under the 1995 Paperwork Reduction Act (PRA) from the U.S. Office of Management and Budget (OMB).¹ This project had relatively limited funding and did not obtain prior approval from OMB for an extended data collection process.
- 3) While many of the costs of a fishery data reporting system can be quantified in monetary terms, many of the benefits of fishery data reporting system are much more difficult to quantify, particularly when comparing one reporting system to another. For example, if one system provides higher quality data, what is the benefit in monetary terms of that quality?

For these reasons and others, the project evolved from its original intent to a much more qualitative assessment of the costs and benefits of the transition to the IERS in Alaska.

In addition to the qualitative assessment of cost and benefits of the IERS, the project also provides (in Section 4 of the report) a review of the programmatic goals and objectives of the IERS that were initially specified in 2001 by the partner agencies (ADF&G et al. 2012). These programmatic goals and objectives are listed below:

1. Collect timely commercial catch statistics that meet the needs of agencies tasked with oversight, management and enforcement;
2. Reduce redundant reporting;
3. Develop a data collection system that considers the business constraints of industry;
4. Provide paper documentation to fishers, processors, and management agencies;

¹ The PRA requires agencies to submit requests to collect information from the public to the OMB for approval. Federal regulations at 5 C.F.R. § 1320.3(c) define information collection and the number of persons that may be surveyed without approval: "Collection of information means...the obtaining...of information by or for an agency by means of identical questions posed to, or identical reporting, record-keeping, or disclosure requirements imposed on, ten or more persons."

5. Allow multiple landing documents to be joined by a unique trip number;
6. Improve data quality;
7. Adhere to regulations;
8. Adhere to confidentiality requirements; and
9. Develop a robust and agile reporting system to meet current and future reporting requirements for agencies and industry

1.2 Project Methodology

Economic literature defines several methods of conducting a CBA of information systems (Sassone, 1988). Because of the limited amount of information that could be collected under PRA rules, the Project Team (comprising the contract monitors at NMFS and ADF&G and the project consultants), determined that the best way to obtain broadly representative estimates of the costs and benefits of the transition to the IERS was to develop a series of case studies of affected stakeholders. A total of 11 stakeholder groups were identified, and a summary of the information developed for each group is provided, in the form of case studies, in Appendix C.

Within the case study for each stakeholder group, the analysis will address the three core IERS reporting applications: eLandings, SeaLandings; and tLandings. It will also discuss, as appropriate, the eLogbooks, agency interface, user support and training, and Commercial Operator Annual Report (COAR) reporting components of the IERS.

In addition to the case studies, the analysis provides estimates of the annual current costs of the IERS incurred by the three cooperating management agencies, in aggregate. Some limited historic cost information is also provided, to the extent it is available from the three partner agencies. However, the additional information on these development costs should not be considered comprehensive.

The broad categories of stakeholder groups are represented by the three partner agencies that have implemented the IERS, components of the industry that are required to report IERS data, and various users of the data that are outside of the three partner agencies. Persons providing information for each of the stakeholder groups are not identified to preserve confidentiality of individual firms. The broad stakeholder groups represent heterogeneous firms. For example, the stakeholder group of processors represents small and large processors of various fish species and both shore-based and at-sea processors. Other data users include government and quasi-government agencies, and private firms that are granted access to confidential data by the persons that are required to submit the data.

Because of the limited number of interviews that could be conducted within PRA limits, the analysis is primarily qualitative. Any quantitative information presented by an entity other than the three cooperating agencies is unlikely to be representative of the stakeholder group as a whole, and was not included as a representative average of all firms in that sector. However, the same types of impacts that result from moving to the IERS are realized by all or most participants in the stakeholder group. For example, they all had to have the infrastructure to input and print fish tickets to use eLandings, but the costs of implementing those requirements vary by firm. It is the general impacts that are the focus of the discussion presented.

Interviews were conducted with key agency staff and other stakeholders to provide a qualitative case study analysis of the costs and benefits. This technique is appropriate when costs (or some costs) are quantifiable but some key benefits are uncertain or intangible. The persons interviewed were selected by the contract monitors, because the contract monitors were most familiar with data providers and data users of the IERS. Interviews of non-agency staff were conducted by the project consultants.

Interviews of the three cooperating agencies' staff were conducted by members of the ADF&G and NMFS staff. The three cooperating agencies also selected the persons within their various departments to be interviewed. Questions used to guide the interviews of processors are provided in Appendix A, and questions used in the interviews of agency staff are found in Appendix B.

The interviews conducted provided wide-ranging qualitative information and opinions regarding how the IERS has changed the way various stakeholders operate and their job satisfaction. Qualitative information is also provided regarding changes in costs and benefits these stakeholders have realized.

Throughout the development of the IERS, stakeholders outside the three cooperating agencies have played a significant role in providing input into the IERS to ensure it functions as intended. Beyond required harvest information, many of the features in this reporting system were requested by, and primarily benefited, members of industry. During the interview process, members of industry were requested to describe how the system's structure has affected their business and provide comments on further improvements that could be made.

2 Background Information on the Legacy and IERS Systems

The IERS—also commonly referred to as the eLandings System—is a fisheries data collection system involving the three separate government agencies that manage commercial fisheries in Alaska. The State of Alaska through ADF&G has management responsibilities for fisheries that occur within three miles of shore and fisheries in federal waters for which the Fisheries Management Plan (FMP) delegates authority (e.g. crab fisheries). NMFS is responsible for the groundfish fisheries that are managed under the Gulf of Alaska and Bering Sea/Aleutian Islands (BSAI) FMPs and primarily occur in the federal Exclusive Economic Zone (EEZ) from 3–200 miles offshore. Finally, the IPHC is responsible for the biological aspects of the management of Pacific Halibut in all waters off Alaska, British Columbia, Washington, Oregon, and California. To obtain accurate and timely catch, discards, processing, and economic data for fisheries prosecuted off Alaska’s coast, the responsible management agencies require commercial seafood processors and harvesting vessels to report data about their harvesting and processing operations (Mondragon, 2013).

NMFS collects harvest and processing data for groundfish species and is responsible for in-season management of groundfish in federal waters. NMFS is also responsible for ensuring that the total removals of a species fall within the Allowable Biological Catch (ABC). ADF&G, among other things, is responsible for harvest data collection for the salmon, herring, and other state fisheries—including groundfish species taken in state waters—and cooperatively manages crab fisheries with NMFS in the Bering Sea through an FMP developed by the North Pacific Fishery Management Council (NPFMC). IPHC is responsible for U.S. halibut harvest data collection and management of the directed Pacific halibut fishery in both state and federal waters. Data used by IPHC are collected using both the eLandings system, and their own data collection programs.

Traditionally, reporting of catch, discards, processing, and value has involved a combination of paper forms and electronic reporting and was not integrated across agencies. Redundant reporting of similar information, lack of consistent business rules, and inconsistent reporting codes caused inefficiencies for the persons submitting, collecting, and using the data.

2.1 Summary of Legacy Systems

Prior to the implementation of the IERS, each of the three partner management agencies had developed their own data collection systems to obtain information necessary to manage their fisheries. These separate systems, which all evolved differently to meet the particular needs of each agency, are referred to as the Legacy Reporting Systems (LRS). Each system is briefly described in this section to provide reader a general understanding the systems that the IERS replaced. More details regarding the LRS can be found in the case studies that are found in Appendix C.

2.1.1 Alaska Department of Fish and Game

2.1.1.1 Fish tickets

Information in this section is primarily derived from the State of Alaska Web Page.² The ADF&G reporting system evolved from the need to monitor and enforce shore-based fisheries, including salmon, herring, shrimp, and crab. Paper fish tickets have been required by ADF&G to document fishing activity under state jurisdiction since 1966. Fish tickets document the harvest of fish and

² http://www.ADF&G.alaska.gov/index.cfm?ADF&G=wildlifeneews.view_article&articles_id=246

shellfish sold, discarded,³ or retained by the fisherman for personal use. All state-licensed processors⁴ are required to complete a fish ticket for each landing from a fishing permit holder selling harvest. Fish tickets are a record of purchase between the processors and the harvester. Resource managers use these transaction records to determine species landed, weight of landings, gear used, harvest dates, harvesters, licenses, and disposition of each species.

Fish ticket records fall into four broad categories, based upon management strategies: salmon, herring, shellfish/invertebrates and groundfish. Each of these fisheries has specific data collection that is reflected on fish ticket forms and each of these fisheries has a specific database and application interface that reflects the unique nature of these fisheries. This structure allows great agility in meeting the information requirements of each fishery, but makes data analysis across fisheries far more complex.

All harvests landed within state waters must be documented on a fish ticket, including halibut. Prior to the implementation of the eLandings System, no halibut was entered into the fish ticket groundfish database. Bycatch of groundfish from the halibut fishery was entered into the fish ticket groundfish database. Fish tickets documenting halibut were data processed by the IPHC and stored proprietarily. Determination of catch/bycatch in the directed halibut fisheries was very challenging.

Conventional fish tickets are, to a lesser extent, still printed and distributed by ADF&G Division of Commercial Fisheries, with the cost of printing and shipping assumed by ADF&G. One copy of the ticket is submitted to the local ADF&G office, where it is reviewed, amended as needed, sorted, the data entered by ADF&G staff, and then reviewed for accurate keying. Additional data validation reports are conducted once the data have been keyed, to validate accuracy.

As the fish ticket represents a receipt of sale, each fish ticket is a four page form—a copy for the buyer, seller, ADF&G, and a second copy for the processor. Seafood processors retain a copy of the sale, as does the fisher selling catch. Processors data-enter many of the data elements contained on fish tickets for their own accounting/operating business systems.

Prior to the implementation of the eLandings System, consultants that focus on in-season bycatch management required submission of harvest information, as well.

The Bristol Bay salmon fishery generates the greatest number of fish tickets on an annual basis. Four people in the Bristol Bay Region were responsible for entering all the fish ticket data submitted for that area. Completing the task frequently necessitated that area biologists assist with backlog. Under the paper fish ticket system, it could take until March of the next year to fully process all the Bristol Bay Salmon fish tickets. This lack of timely data access impeded the information requirements used by fisheries managers, scientists, and policy makers.

Processors operating exclusively in federal waters exclusively for federally managed fisheries, such as groundfish, are not required to fill out ADF&G fish tickets. Because of this, ADF&G had incomplete data sets for the groundfish fishery. To obtain an estimate of total groundfish landings or catch at a vessel or processor level, the agencies had to develop data sharing agreements. Negotiating these data sharing agreements had the potential to increase tensions between agencies and made the sharing of data less efficient.

³ At-sea discards are not required to be reported on fish tickets, but sometimes are included. They are not required because the processor cannot be held responsible for determining the amount of at-sea discards that they cannot verify.

⁴ For simplicity we refer to processors, but any first purchaser, processor, exporter or transporter of raw fishery resources must complete and submit a fish ticket.

All three eLandings agencies have shared jurisdiction in some fisheries and generated separate and often redundant reports. For example, a processor may need to generate and file a fish ticket, Individual Fishing Quota (IFQ) landings report, weekly production report, and an IPHC logbook report for the same fish.

Because paper fish tickets were often hand written, each fish ticket would need to be reviewed by the processor to determine whether it was legible and complete prior to submission. If the processor determined it was, the fish ticket would be sent to ADF&G staff to review legibility, accuracy, and completeness. If the ADF&G staff found any issues that needed to be completed or corrected, they were returned to the processor. This process created inefficiencies for both the processor and ADF&G staff. Depending on the number of corrections that were required, this process also created the opportunity for tensions to develop between processor staff submitting the fish tickets and agency staff reviewing the fish tickets that were submitted.

Paper fish tickets were also limited in the amount of information that could be collected on a page. Over the years, multiple versions of fish ticket forms were in distribution. Redesigning the paper fish ticket to collect additional information or modify the fields that were already being collected was a cumbersome process, given the static nature of the forms.

2.1.2 International Pacific Halibut Commission

The IPHC has been managing and monitoring the halibut fishery since 1924, and built its own reporting and monitoring systems. The IPHC has also relied on cooperation with state, provincial and federal governments in Canada and the U.S. to provide additional reporting of catch and effort. Prior to the implementation of the IERS in Alaska, the first buyer of halibut harvested from Alaskan waters was required to record landings on ADF&G fish tickets. Those Pacific halibut fish tickets were submitted to the local office of ADF&G. If the report documented only halibut harvest, they were mailed directly to the IPHC. Landings with bycatch of other species were initially processed by ADF&G and then forwarded to IPHC for additional (and redundant) data processing of the halibut harvest. The IPHC also collected logbook data to supplement information obtained from fish tickets. The supplemental data focused on obtaining information that provided a better understanding of catch per unit effort (CPUE), productive fishing locations, gear configuration, and the mortality of undersized fish that are discarded. In addition, port samplers collected data at the dock and these data would, as necessary, be used to modify fish ticket data. These modifications were used internally by the IPHC, but the revised data were not used to update fish ticket files available to other agencies.

2.1.3 National Marine Fisheries Service Alaska Region

NMFS has primary responsibility for managing the Alaska's groundfish fisheries, but is also involved in the halibut, crab, and scallop fisheries in partnership with other agencies. Prior to the IERS, there were two legacy reporting systems at NMFS, one that supported management and reporting in the federal groundfish fisheries, and another that supported the IFQ halibut & sablefish program.

2.1.3.1 Groundfish Reporting

The legacy systems for reporting groundfish harvests evolved from the fact that prior to the establishment of the U.S. EEZ in 1976, almost of the harvest of groundfish off the coast of Alaska was taken by foreign catcher-processors (both trawl and longline), that were operating in international waters outside the "territorial sea" (beyond 12 miles). With implementation of the Magnuson-Stevens Fishery Conservation and Management Act in 1976, the U.S. claimed waters of the EEZ out to 200

miles. Rather than immediately expelling the foreign fishing vessels from what were now U.S. waters, the NPFMC and NMFS allowed the foreign fisheries to be phased out during an Americanization of groundfish that lasted through 1990—the last year foreign at-sea processing vessels operated in joint ventures with U.S. catcher vessels.

To monitor the “at-sea” activities of the foreign and later U.S. joint venture fleets, the primary reporting and monitoring tools involved logbooks and reports on the amount of processed product on board coupled with at-sea observers. In general, the logbooks reported information on fishing effort, while the production reports provided information on retention and discards and on the amount of processed product generated. A third major component of the at-sea monitoring system was the “Off-Load Report” in which catcher-processors and motherships reported the amount of product moved off the vessel onto trampers, barges, or shore-side consolidating and expediting facilities.

The overlap of federal and state recordkeeping and reporting of groundfish is complicated by the fact that there are four basic types of U.S. groundfish processors, which conduct different activities in different areas:

- 1) Shore-based processors are required to complete federal reporting requirements if they have a federal permit, plus all of the reporting requirements of ADF&G because they are operating in Alaska;
- 2) Stationary floating processors are required to complete federal reporting requirements if they have a federal permit, plus all of the reporting requirements of ADF&G because they are operating in State of Alaska waters;
- 3) Mothership processors do not catch fish but they take deliveries of fish from catcher vessels. Motherships and their associated catcher vessels can operate in the EEZ and/or state waters. Based on their activity they can fall under federal record-keeping and reporting requirements when operating in the EEZ and State of Alaska regulations if they receive landings from catcher vessels harvesting in state waters, offload in state waters, or are conducting harvest in the CDQ program;
- 4) Catcher-processors catch and then process their own harvests and can operate in the EEZ and/or state waters. Like motherships, catcher-processors have federal recordkeeping and reporting requirements and are also regulated by state requirements if they are harvesting catch associated with the CDQ program, or are operating or harvesting in state waters.

The fact that motherships and catcher-processors operate “at-sea” means that it is more difficult for fishery managers and enforcement officers to monitor harvests of raw fish. Because at-sea processors store their product on board, however, managers and enforcement officers can approximate how much catch had occurred by back-calculating from processed product amounts. For this reason, groundfish reporting rules still require the processors of groundfish not only to report both harvest and deliveries, but also processed product.

In addition, because the groundfish fisheries are managed using total allowable catch limits, groundfish managers needed a more timely reporting system than could be reasonably accomplished with a paper fish-ticket system in the years before the internet and email became the norm.

To address these issues NMFS developed a Weekly Reporting system for all groundfish processors. Processors that took deliveries of groundfish were required to maintain and submit a Weekly Production Report (WPR), and later a Daily Production Report (DPR). The WPRs and DPR included estimates of retained and discarded harvest by management area. They also included reports on the amount of product produced by species and product type. The weekly and later daily reports that were required of shore-based processors and stationary floating processors also required cumulative

information on the harvests of each catcher vessel delivering to the processor by management area and species. Because these reports included cumulative information on harvest by catcher vessels, they were called Daily Cumulative Production Logs (DCPLs). Because shore-based and stationary floating processors⁵ were also required to submit fish tickets to ADF&G (which shared the groundfish information with NMFS), there was a significant amount of redundant reporting.

WPRs and later DPRs and DCPLs were originally either faxed or emailed to NMFS, and hard copies of the logs and reports were required to be submitted to NMFS as well. Starting in 2000, NMFS developed applications so that these data could be submitted electronically. Software called 'Shorelog' enabled shoreside processors to submit groundfish landings data and 'Vlog' enabled the at-sea fleet to submit WPRs. The type of information that was required to be reported by shore-based processors and stationary floating processors in their DCPLs can be found at on the NMFS-Alaska Region webpage at <http://alaskafisheries.noaa.gov/rr/logbook/ssdcpl1.pdf>. For Motherships, <http://alaskafisheries.noaa.gov/rr/logbook/mdcplreferenceonly.pdf> provides an example. NMFS' legacy electronic reporting systems only met federal reporting requirements, so shore-based and stationary floating processors were still required to submit fish tickets to ADF&G. Under the IERS, the requirement for these three types of processors to submit DPRs and DCPLs on paper or using Shorelog or Vlog has been eliminated—they now report through eLandings or SeaLandings.

2.1.3.2 IFQ Reporting

When the IFQ program for halibut and sablefish was implemented, it created a need for real-time reporting of catch data for halibut and sablefish, so that each IFQ holder's available quota could be monitored. To address that need a "credit card swipe" system for IFQ was implemented. Each IFQ holder was issued a magnetic stripe (magstripe) card⁶ that contained their permit information and their IFQ balance. IFQ holders were required to swipe their card when IFQ species were sold and the amount sold was deducted from their balance and automatically sent to the Restricted Access Management Division of NMFS. This system met the agencies' management needs for close to real-time data, but did not do away with redundant reporting required from processors. The original system, while the state-of-the-art when implemented, had issues with cards and card readers malfunctioning. Subsequently, NMFS eliminated the swipe card system and developed an online IFQ reporting system. However, the IFQ system was separate from the legacy groundfish reporting system so if a landing had both groundfish and IFQ species, then processors were required to use both federal reporting systems. In addition, if the processor was issued a state processing permit, they were also required to fill out a paper fish ticket to record the landings.

The implementation of IFQ created opportunities for quota shareholders to join together on a single vessel to fish. Each quota shareholder represents a separate seller of product, generating a fish ticket for each transaction. This stacking of permits could generate multiple fish tickets for each landing, creating additional work for processing staff and for ADF&G staff. The redundant reporting requirements, combined with separate fish tickets, reduced managers' ability to review and track fishing effort by trip.

⁵ U.S. motherships were supposed to provide fish-ticket information, and many did so, but for motherships the fish-ticket information was generally a secondary source of harvest information relative to observer reports, WPRs, and DPRs.

⁶ Based on the same structure as a credit card, where the holder's information was transferred to the system when the card was swiped through the card reader at time of sale. Buyers had card readers to swipe the cards through at the time of sale.

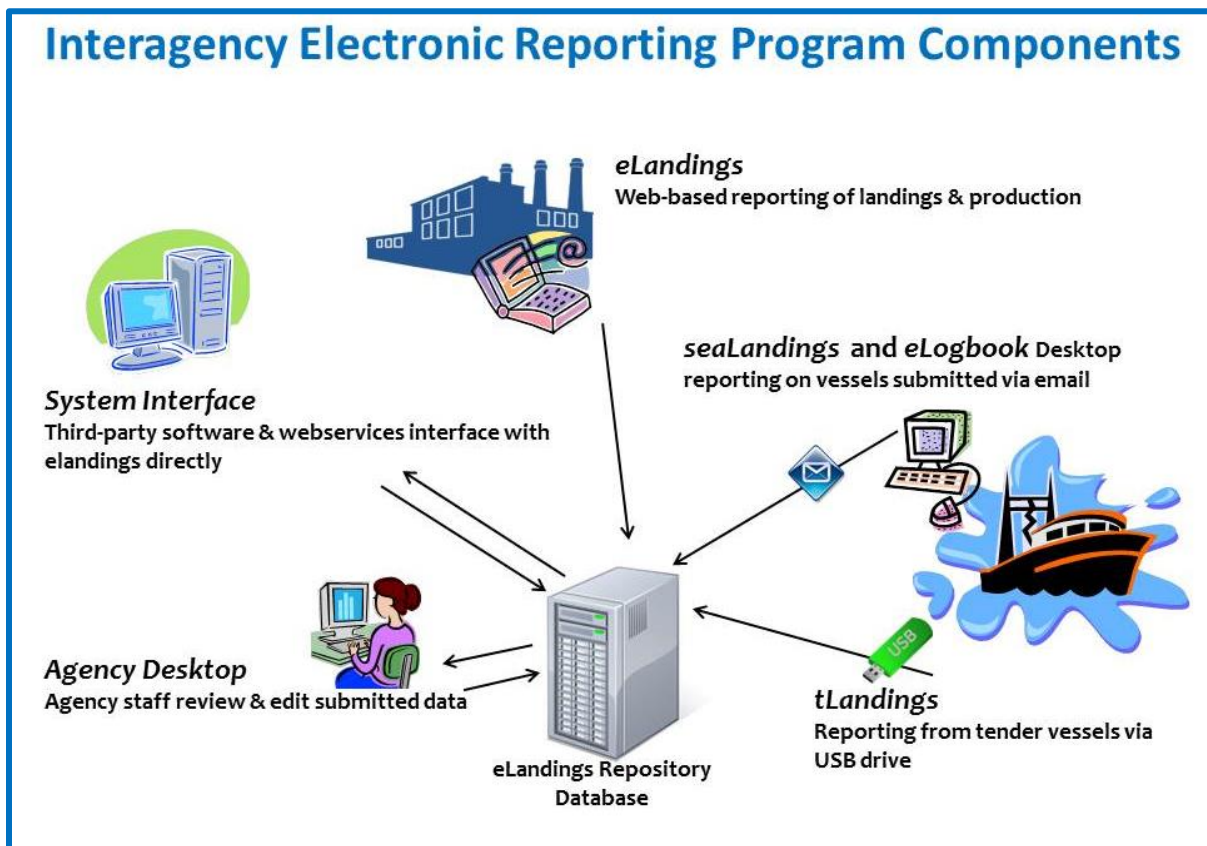
2.2 Summary of IERS – eLandings System

Development of the eLandings System began in earnest in 2001. The three management agencies came together to develop a set of program goals:

- Collecting timely commercial catch statistics that met the needs of each responsible agency
- Reducing redundant reporting, consideration of industry business constraints
- Providing paper documentation of catch (to fishers, processors, and management agencies), and allowing multiple landing documents to be joined by unique trip number
- Improving data quality
- One time data entry of reports
- Adhering to regulatory and confidentiality requirements

The IERS was first implemented for the Crab Rationalization (CR) Program under a final rule published March 2, 2005 (70 FR 10174). The use of eLandings was implemented for groundfish fisheries and the halibut and sablefish IFQ Program through a final rule published December 15, 2008 (73 FR 76136). The State of Alaska has phased in the IERS on a more “voluntary” basis. The initial implementation focused on web-based reporting and a single catch and production database for all landings reported with the eLandings System, and an interface application for agency staffs. Figure 1 provides a graphical overview of the IERS.

Figure 1. Major Components of the IERS



As Figure 1 illustrates, the IERS has five core components:

- eLandings provides web-based access for seafood processors to submit catch and production information.
- SeaLandings, which includes an eLogbook, is the locally installed program providing email-based data submission for clients with no web access (typically for catcher-processors and motherships which report at sea).
- tLandings is a USB-installed program for salmon and groundfish tenders with no web access.
- The Agency Desktop is a locally installed program that provides access to the data for fisheries agency personnel that have clearance to access the confidential data. Agency users can search, view, and edit data.
- The eLandings System Interface allows direct sharing of information between industry's internal record-keeping systems and the IERS database.

In addition to the core components shown in Figure 1, the IERS also includes other secondary components:

- The catcher vessel eLogbook is a locally installed program on computers aboard harvesting catcher vessels.
- A COAR data entry form has been integrated into eLandings, giving processors the opportunity to streamline the required submission of these reports by allowing them to extract much of the necessary information from eLandings and SeaLandings reports that have already been submitted.

The three management agencies have worked closely together to implement the IERS, with a primary goal of developing a system to collect timely information and eliminate redundant fishery reporting to management agencies. The IERS provides a consolidated, electronic means of reporting landings, production, and value of commercial finfish and shellfish to multiple management agencies. This electronic reporting system is unique in the U.S., where typically each agency has traditionally collected the data they require independently.

During the development of the eLandings program, the agencies worked together to implement a set of business rules that must be adhered to before the system allows data to be submitted to the eLandings repository database. Standardized business rules help improve data quality initially entered into the IERS and speed the data entry process. The IERS also has improved documentation of the information collection forms, and generated more consistent codes that are used to define locations, gear types, management program, species, delivery, and disposition. Partner agencies have also developed support and training programs for users of the system as part of the overall eLandings project.

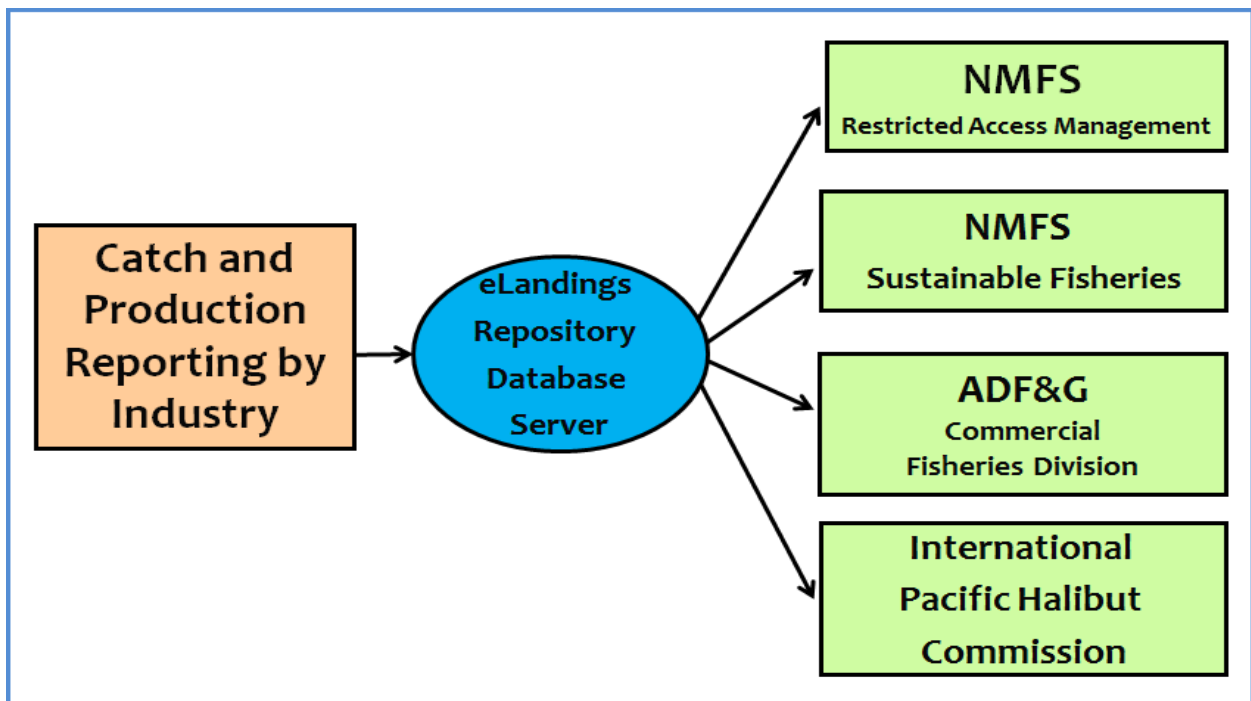
Each fishery management agency has a process to pull harvest data from the eLandings repository database into their own database of record (Figure 2). Data pulls occur multiple times each day and are based on the management needs of each agency. NMFS pulls crab, groundfish, and IFQ crab landings reports; production reports; and eLogbook data. ADF&G extracts all landing reports and IPHC pulls data associated with halibut. Data are rapidly available to management agencies as well as industry.

Finally, the IERS maintains a testing and training environment and a WIKI⁷ to document test plans, development protocols, user documentation, valid codes, and training resources.

Development of additional program modules and eLandings infrastructure continues. The agencies have noted that due to budget limits they have not always been able to fully staff the project. To live within their budget for the program, they have made do with fewer people. For example, they have not been able to focus as much IT effort on the system architecture or monitoring as desired and additional fisheries still need to be brought into the eLandings system. The agencies are currently trying to catch up on the backlog of work that has accumulated over time.

The following sections provide a brief description of each of the IERS components that were introduced above.

Figure 2. IERS Data Flow Diagram with Fishery Management Agencies in Alaska Who Are the Primary Data Users



2.2.1 eLandings

The web-based application provides industry with the ability to submit landing reports (and associated fish tickets), IFQ fisher/processor quota harvest, and processor production information from a single reporting system. The information submitted is stored in a shared repository database. ADF&G, IPHC, and NMFS Alaska Region extract data submitted by industry to their individual data systems (Figure 2). This system allows persons to submit data once to the data repository and each agency to extract the data they need from that repository.

⁷ A WIKI is a web-based application that allows users to collaborate and interact to develop content. The eLandings WIKI can be found at <https://elandings.atlassian.net/wiki/dashboard.action>.

eLandings generates a paper fish ticket that must be printed, signed, and submitted to ADF&G within 7 days of the completion of the offload. Per State of Alaska regulations, completed ADF&G fish tickets are submitted to the local ADF&G office.

2.2.2 tLandings

Each year, approximately 250,000 landing report fish tickets are created, generated from the four primary fisheries—groundfish, shellfish, herring and salmon. Of this number, approximately 220,000 landings occur in the salmon fishery and deliveries to salmon tenders account for up to 95 percent of all salmon landings. Tender vessels act as agents for seafood processors and take delivery of seafood product offshore. This system allows catcher vessels to remain in harvest areas, fishing. Deliveries are, for the most part, of small poundage and depending upon the tender’s capacity, a tender can accept as many as 100 deliveries prior to returning to the processing facility. This system allows for the greatest efficiencies for both the catcher vessels and the seafood processors. Processors do not want their limited dock space clogged with individual catcher vessels.

A large seafood processor in an area like Bristol Bay may have a fleet of up to 40 tenders. Irrespective of the reporting platform, paper or electronic, fish tickets are created on board the tender. The goal of the tLandings application is to create electronic records that can be transferred to the eLandings repository database and then exported to the seafood company’s business application, meeting the goal of one-time data entry.

To meet the goal of electronic reporting on board a tender, each vessel needs a laptop computer with a numeric key pad, an inexpensive laser printer with ink cartridges and paper, a magstripe reader, and thumb drives that contain the tLandings application.

The tLandings application is a locally installed application developed for tender vessels without web access. The tLandings application is loaded onto a thumb drive with a list of the authorized users, the processor’s vessel list, and a species list, and includes the option for the processor to add a price list. Landing reports are created and stored on the thumb drive. The application creates a printable fish ticket, ready for signature. Once the tender trip is completed, the thumb drive is provided to the processor’s office staff for upload into the eLandings repository database. Creation of the landing report fish ticket is identical to completion of the conventional paper fish ticket. What has changed with the development of electronic reporting is tiered levels of data validation and automated data capture. The Commercial Fisheries Entry Commission (CFEC) permit card now has a magnetic stripe that loads all fishery permit information via a magstripe reader. Validation protocols and business rules are imbedded in the application code to provide immediate validation at the point of reporting. Some values, such as number of fish, are calculated from an average weight that can be repeatedly determined throughout the fishery. All basic mathematical sums are automated as well.

Working with industry, the tLandings application collects many data elements that are of value only to the seafood industry. These data elements include:

- Chill type
- Fish temperatures (up to three with a calculated average temp)
- Time of Landing
- Landing Characteristics
 - Dock delivery
 - Partial delivery

- Use of slide
- Fish floating in the hold
- Quality Assurance
- Deck loaded catch
- Tender Batch Identification, which assists with product traceability

Validation of the landing report occurs when the data are saved. Error messages provide guidance on corrective actions, and once corrected, a print-ready PDF fish ticket is created.

2.2.3 SeaLandings (Including Catcher-processor and Mothership eLogbook)

The SeaLandings application is a locally installed program that enables an email-based submission alternative for at-sea catcher-processors and motherships without web access. The same required information (landings, processing, and logbooks) can be submitted through SeaLandings as through eLandings. The difference between the two systems is how the information is electronically entered, stored, and then transmitted to the data repository.

SeaLandings also includes an electronic logbook (eLogbook) component for catcher-processors and motherships that fulfills the logbook requirements for those vessels. The eLogbook replaces the paper DCPL and is required for any catcher-processor or mothership that is required to use a Flow Scale. Vessels are required to submit daily Flow Scale Test results using the eLogbook. Daily logbook entries are submitted through SeaLandings along with any production or landing report transmissions.

2.2.4 Agency Interface

The Agency Interface is a locally installed program that allows authorized agency personnel access the eLandings repository data. It is used by agency staff including enforcement personnel (NMFS Office for Law Enforcement [OLE] staff and IFQ data clerks, and Alaska State Troopers) to perform their official duties.

Fisheries management staff view and in some cases modify these self-reported data using other observations of fishing activity, such as observer data, confidential dockside interviews with the vessel operator or logbook reports. ADF&G staff also verify the management program for the fishery, such as state-managed Pacific cod, Aleutian Island pollock, American Fisheries Act (AFA) Pollock Program, etc. and assign harvest codes. Harvest codes are used to identify specific harvest of seafood product, down to individual species, in some cases. Examples of harvest codes include federal or state managed groundfish, harvest from a hatchery terminal area, cost recovery test fishery, bycatch overages, etc. The correct assignment of management programs and harvest codes allows for the efficient and discrete extraction of data.

In addition to the task above, ADF&G staff assign an additional identification to each fish ticket record for archival purposes. This process is commonly referred to as fish ticket batching.

The Agency Interface is installed on the end user's workstation and provides access to the eLandings repository database records and tables. The Agency Interface application enables staff to perform a variety of functions. In addition to the above-mentioned functions, staff can add, edit, and disable processor operations and user accounts and also manage agency user accounts. Landing reports that were submitted on paper fish tickets can be entered. An important feature of the Interface application is the ability to search for reports, permits, vessels, eLandings operations, and users, and perform queries. In summary, the Agency Interface is a one-stop shop for agency end users.

2.2.5 System Interface

The eLandings System Interface allows direct sharing of information between industry's internal record-keeping systems and the IERS database. Web services are available for third-party developers to develop tools to communicate with the eLandings database. In addition, the eLandings program provides industry end users with the ability to extract landing and production report information through the web interface. Report data can be extracted by the user in three different formats: XML, CSV, and MS Excel. Users can download and customize report templates to easily extract consistent reports. Additional information on the system interface and data extract tools are available at the WIKI.⁸

2.2.6 Secondary Components of the IERS

2.2.6.1 eLogbook for Catcher Vessels

Trawl and longline catcher vessels may voluntarily use an eLogbook⁹ through an eLogbook-only version of the SeaLandings software application. The eLogbook replaces the paper version of the Daily Fishing Logbook. The eLogbook is a locally installed program that contains the logbook forms for catcher vessels. Email does not need to be accessible on the vessel, since the transmission file can be saved to a USB drive and taken to another location to email the eLogbook file to NMFS.

The catcher vessel eLogbook has the capability of generating a discard report that can be given to the processor when a catcher vessel makes a delivery to satisfy regulatory requirements to provide discard reports and to give the processor improved information to enter on the Landing Report(s) for the delivery. A separate discard report page is generated for each management program and gear code combination occurring on hauls or sets in the logbook for the voyage. This corresponds to the fish tickets that will need to be submitted. Each discard report page has two sections. The first provides the statistical area worksheet for the management program and gear code for the dates fished. The second section provides lines to report weight and/or number of fish that were discarded by management program, gear code, and species.

2.2.6.2 Commercial Operator's Annual Report

The State of Alaska requires that the first buyer of raw fish, persons who catch and process fish, and persons who catch and have fish processed by another business file a COAR. The National Marine Fisheries Service also requires COARs from processing vessels operating in federal waters of the EEZ. The COARs require the submission of data on seafood purchasing, production, and both ex-vessel and wholesale values of seafood products.

The buying information in COARs are reported by species, area of purchase, condition of fisheries resources at the time of purchase, type of gear used in the harvest, pounds purchased, and ex-vessel value, including any post-season adjustments or bonuses paid after the fish was purchased. Production information is reported by species, area of processing, process type (frozen, canned, smoked, etc.), product type (fillets, surimi, sections, etc.), net weight of the processed product, and the first wholesale value.

⁸ See <https://elandings.atlassian.net/wiki/display/iftoc/eLandings+System+Interface+Guide> and <https://elandings.atlassian.net/wiki/display/doc/Report+Extract+Tool>

⁹ <https://elandings.atlassian.net/wiki/display/doc/eLogbook+for+Catcher+Vessels+using+SeaLandings>

The buying section of the COAR should be a summary of all fish tickets associated with a specific State of Alaska Fisheries Business License processor code. If the seafood processor is using the eLandings System to document most or all of its purchases, an automated process is possible.

Beginning in 2011, ADF&G began development of an eLandings generated COAR Application. Initial implementation of this eLandings feature occurred in 2014. The Department is now exploring the roll up of production reports from the eLandings system for groundfish. As groundfish is the only species subject to production reports, the benefit would be limited, but automation of even a limited number of species for this report can be of assistance to both the agency and industry.

3 Summary of the Cost and Benefit Themes Derived from Agency and Key Informant Interviews

This section focuses on the major recurring themes regarding costs and benefits that emerged from the interviews conducted with stakeholders. Discussing the recurring themes facilitates a focused presentation of those issues. Often stakeholders representing different user groups had similar responses to the impacts of each theme. When stakeholders expressed different viewpoints, each point of view is described. The theme approach is used to concisely describe the important changes that resulted from implementing the IERS from a wide variety of perspectives, without excessive detail or redundancies.

Detailed summaries of each stakeholder group interviewed are provided in Appendix C in the form of individual case studies. Because the information presented summarizes each stakeholder group that was interviewed, the descriptions often contain redundant information. Providing the detailed reports of each stakeholder group in the appendix allows the reader to more closely examine the specific and sometimes varied impacts of the IERS, without bogging down the main body of the paper with redundant information.

3.1 Costs in General

The agencies identified costs for the program's startup funding separately from yearly operational budgets for the IERS. The startup funding was apportioned and spent over several years for planning and initial program development. The grants used to fund development were approximately \$2.1M. Each agency also contributed substantial amounts of staff time that was not included in that estimate. The ongoing annual costs for the three partner agencies were estimated to be over \$2.6M in 2014. These costs included the salaries and benefits for approximately 19.7 full-time equivalent (FTE) employees and additional contract employees. A more detailed breakout of these costs is presented in Table 1 on page 19.

Costs for the other stakeholders that use the IERS varied considerably across individual firms that were interviewed. The variability of the cost by individual firm and the limited number of interviews conducted prohibit imputation of average firm-level costs for the transition to the IERS, or annual costs under IERS. In addition, firms interviewed were generally only able to quantify specific current cost changes associated with the IERS, and not net changes for the entire business or costs to report data under the Legacy Reporting Systems (LRS).

Some firms experienced increased costs associated with additional staff and equipment costs needed to enter the landings data quickly electronically to meet the needs of their delivery vessels. Firms that reported increased costs in some areas of the business also noted that cost savings were realized in other areas. For example, one firm noted that costs may have increased at the processing plant, but cost savings were realized at the firm's headquarters.

Other firms had lower costs that were in part attributed to the IERS. These cost savings were associated with fewer staff needed in the departments tasked with data entry, accounting, and inventory control. In general, the firms that reported increased costs were typically firms that took many deliveries from smaller vessels. Their staff needed to generate many fish tickets during a given day during peak delivery seasons, so they had to have sufficient numbers of trained staff and computer work stations to handle their delivery schedule. Firms that took fewer deliveries from larger vessels reported cost savings overall.

Whether these trends hold across all stakeholders in a class is not known with certainty given the limited number of interviews conducted. However, the same conditions that resulted in the increase or decrease in costs would likely need to be addressed by all stakeholders in a given class.

In summary, the IERS is estimated to cost the three partner agencies about \$2.6 M per year to operate. Industry costs vary by firm and the limited number of surveys prohibit an estimate of change in total costs.¹⁰ The difference in total costs between the IERS and the LRS is unknown, and the data needed to make those calculations are unavailable. The benefits of the program are numerous, varied, and qualitative in nature. It is not possible to provide any quantitative estimate of the direction or magnitude of the net change in costs and benefits between the two programs. However, the consensus of almost all stakeholders interviewed is that the IERS program is far superior in many ways to the LRS.

3.2 Agency Costs Details

The three partner agencies provided funding for the IERS initial application development, implementation, and subsequent additions to the program. Start-up funds were used to make purchases necessary to develop and implement the project. Additional internal agency funding was provided by committing staff time to the project. The total amount of staff time was not tracked during development and implementation. Those costs are not quantified in this document, but are in addition to the start-up costs presented.

3.2.1 Development Costs

NMFS provided two grants for development of IERS totaling \$1.05M. Those grants enabled contracts to be funded for scoping, project design, and application development for IFQ crab, halibut and sablefish, and non-IFQ groundfish reporting. ADF&G contributed \$906K for initial application development and maintenance of salmon reporting capabilities, including tLandings. ADF&G also contributed an additional \$165K for the initial application development to integrate COAR into IERS. The two agencies contributed approximately equal amounts of the \$2.1M, plus substantial amounts of staff time to develop the current IERS.

2014 Costs

During 2014, the total IERS costs for the three agencies were estimated to be about \$2.62M (Table 1). These costs include the salaries and benefits for approximately 19.7 FTE employees, and also include contract staff.¹¹ Annual staffing for user support and for the training coordinator was estimated to be 3.1 FTEs. Their compensation was estimated based on:

- 2.2 FTEs compensated at ZP3¹² (GS 11/12) step 3 mid-range salary plus benefits for those staff members; and

¹⁰ The study did ask processors about their added costs based on increased supplies, shipping, modifications to add computer workstations, etc. However, because of the very small number of processors interviewed and significant variations in responses, the analysts do not believe that a numerical estimate using these data would be reflective of the overall cost to the industry as a whole.

¹¹ In general, the cost of using a contractor is expected to exceed the cost of agency staff doing similar tasks. However, due to hiring limits, and the flexibility that using contracted staff offers, contract staff are often used in these positions, noting that contractors are typically not utilized in program management roles.

¹² ZP3 is a pay grade defined within NMFS for persons in the Scientific and Engineering career path and is equivalent to a GS 11/12 pay grade. ZP2 in this case would be equal to a midgrade GS 8/9 pay grade.

- 0.85 FTE at ZP2 step 2 mid-range salary plus benefits.

Costs for the IT Program Manager were based on 3.5 FTEs compensated at a ZP3 IT level (2210 series) at mid-range salary plus benefits. This pay scale equates to each FTE being compensated at \$141.5K per year. Costs for the 7.6 FTEs tasked with quality assurance, data batching, and data entry were estimated at ZP2 Step 2 mid-range salary plus benefits. This equates to a total of \$593.6K or \$78.1K per FTE. The 4.5 FTEs for application development are estimated to cost \$633.9K per year, or \$140.9K per FTE.

As discussed earlier, all of these costs would be expected to be greater if they were contracted. The increased costs are not estimated, but would depend on the contract bids that were received for the work deliverables.

Both NMFS and ADF&G have dedicated program coordinators with a primary responsibility to be a liaison between the agencies' programming and management staff and industry. They provide formal training events, individual site and WebEx trainings, and develop additional training resources such as lessons and training videos. They are also responsible for all end user documentation for both agency staffs and industry.

Table 1. Three cooperating IERS agency costs for 2014

Item	Cost (\$1,000)	FTE
User Support Outside Agency		
<i>Help Desk Support</i>	204.0	n/a
Non-staff costs (e.g. travel, materials, servers, licenses, etc.)		
<i>Field Support, Training, User Support</i>		
Interagency Coordination & Training	33.0	n/a
Training Events & Training Materials	40.0	n/a
<i>Hardware/Infrastructure</i>		
Platform Support	25.0	n/a
Server Hardware	20.0	n/a
Server Hosting and Licenses	139.2	n/a
<i>System Development and Maintenance</i>		
Technical Training	26.0	n/a
Total non-staff costs	283.2	
Staffing costs, including contractors (but not help desk)		
<i>Field Support, Training, User Support</i>		
FTE for User Support/Training Coordinator	300.0	3.1
<i>Hardware/Infrastructure</i>		
FTE for IT Program Management (system architecture, IA, configuration management, etc.)	495.3	3.5
<i>System Development & Maintenance</i>		
FTE Data QA/ Batching, Data Entry	593.6	7.6
FTE for Program Management, Project Coordination, and Prioritization	111.5	1.1
FTE or Contractor for Application Development	633.9	4.5
Total Staffing Costs, Including Contractors (but not help desk)	2,134.3	19.7
Total Estimated Annual Cost of IERS	2,621.5	19.7

Source: NMFS AKR and ADF&G

The total non-staff related costs for 2014, presented in Table 1, are \$283.2K. Interagency coordination and training is budgeted to fund annual meetings¹³ of the partner agencies to resolve issues that arise that must be addressed by the all partner agencies and for planning future development goals.

An additional \$40K was used to fund training events and provide training materials. During 2014, at least eight official training events were supported. Those training sessions are presented below:

- November 18th Demonstration of CV eLogbook for Icicle Seafoods
- November 18, eLandings for Salmon Workshop, Seattle, WA
- November 17, SeaLandings Training, Seattle, WA
- May 14, Recordkeeping and Reporting Workshop for the Freezer Longline Fleet
- April 15, eLandings CDQ Training, Anchorage, AK
- April 15, Data Technician Training, Anchorage, AK
- April 16, eLandings Training
- Alaska Wildlife Trooper Training.

A more detailed summary of each training event may be found on the eLandings WIKI.¹⁴ The link provides an agenda for each of the training sessions that includes participants and the topics that were addressed.

Help desk support is provided through two contracts and accounted for \$204K in annual costs. The help desk contracts provide two levels of 24/7 call-in support for stakeholders that have questions regarding the IERS. Through one contract, technicians manning the help desk 24/7 are able to provide “triage” and answer to general questions regarding the status of IERS (for example, if the website is down or if there is an internet outage at a location in Alaska). If questions require more detailed responses or are more complex, they direct the calls to the second-level help desk or appropriate agency personnel. The second-level Help Desk is available from 6 AM to midnight, seven days per week and provides more in-depth help for eLandings end users. The combination of the two types of Help Desk support provides support outside of business hours and reduces the number of basic questions that agency staff must address, reducing the burden on existing agency staff. Hiring additional agency staff to be available to answer phone calls 24/7 would be more costly¹⁵ than using the help desk system.

Some agency staff noted during the interviews that the cost of mailing paper copies of the fish tickets from the regional offices to Juneau had increased. The increased cost was due to the additional amount of paper that was being sent. The packages are bigger/heavier because the processor will send the fish ticket page and the tender tally sheet. The additional cost of postage was estimated to be about \$100 more with the eLandings/tLandings systems in Bristol Bay, based on interview with staff in that area. They process the largest number of fish tickets and have the greatest postage costs. Other areas have also realized increased postage costs, but are likely less than \$100 per year.

¹³ A copy of the agenda for the 2014 annual staff meeting is available at:

<https://elandings.atlassian.net/wiki/download/attachments/53313539/eLandings%20Annual%20Staff%20Meeting%20Agenda%202014.docx?api=v2>

¹⁴ <https://elandings.atlassian.net/wiki/display/tr/Training+Events>

¹⁵ Based on personal discussions with key IERS staff.

Costs identified by the NMFS observer program are not included in Table 1. These costs include the additional time spent tracking down and fixing errors in their data. Additional time is needed as a result of improved quality assurance/quality control capabilities that resulted from being able to compare their data with the IERS data. Observer program staff noted that more IT time is also needed to ensure the data streams are working properly. Also observer staff need to have more technical capability to efficiently work with the additional data. None of these costs were quantified.

The only cost identified by enforcement staff was that the IERS placed a greater demand on the IT support. Because enforcement staff relies on IT staff for support, it can cause problems when, for example, java script programs do not work. Also, when new people come on board, they are assigned a desktop computer. Installing the Help Desk application and eLandings software must be done immediately, although it was also noted that set-up is still minimal as long as it is timely.

Overall the costs reported by observer program and enforcement staff are small relative to the benefits derived. Based on the information available it was not possible to estimate the change in costs.

3.3 Costs to Catcher Vessels

The primary cost to catcher vessels noted during the interview process, was the time spent at the processor waiting to sign a printed copy of the fish ticket. The State of Alaska uses the fish ticket as a harvest document created at the point of first purchase (sale) and requires the fish ticket filled out by the processor or fish buyer to be signed by the harvester at the completion of the landing. Waiting to sign the fish ticket, in some instances, delays the harvester's return to fishing. The delay can be a source of conflict between the harvester and processor during fisheries where the harvester is competing to catch the available resource. Delays in completing the fish ticket appear to be most problematic at smaller processors or processors that take a relatively large number of deliveries from smaller vessels. For example, a processor taking deliveries of salmon or halibut from many small vessels may have several people waiting on a fish tickets to be completed. One processor noted that if it takes 20 minutes to 30 minutes to complete a fish ticket and the plant only has one or two computer stations to generate the eLandings report, during peak delivery times the wait increases. The time spent waiting was not reported here because it can vary widely by processor and fishery. However, the bottleneck of needing access to a computer terminal to enter the data as opposed to filling out a paper form that could be completed anywhere in the plant was cited as the issue. At plants that take fewer deliveries, the increased wait times appear to be less of an issue. For example, a processor that primarily takes trawl deliveries of pollock and Pacific cod may only need to generate fewer than 10 eLandings reports each day. Because these plants generally have staff and resources to quickly and efficiently generate the limited number of reports, the vessels delivering the fish do not realize noticeable increases in wait times relative to when paper fish tickets were used to report the landing. Processors creating IFQ landing reports that represent stacked CFEC permits did indicate time savings in the completion of fish ticket.

3.4 Costs to Catcher-Processors & Motherships

Catcher-processors and motherships using SeaLandings will, in almost all cases, already have the computer and printer equipment needed. Catcher-processors have reported using a little more paper and ink to print production reports and fish tickets. Those costs were not considered a major expense of moving to SeaLandings.

Catcher-processors and motherships that are required to use a flow scale are also required to complete eLogbooks. While the cost of computers, equipment, and training necessary to complete

eLogbooks was not estimated, it is expected to be minimal (about \$1,000 per vessel if they do not have a laptop). However, as noted above, the catcher-processors and motherships that are required to use eLogbooks already have the technology (laptop or PC) on the vessel. As a result, it is unlikely that these vessels incur additional hardware costs to submit eLogbooks, other than costs to train the captain, mate, purser or other crew member to complete eLogbook entries and any additional printing costs. All catcher-processors have internet capability or other communication equipment on the vessel. One company representative estimated that SeaLandings/eLogbook reports accounted for about 20 percent of their vessel's internet usage. If the internet package charges per unit of data used, increases in internet usage have a greater cost to the company.

For vessels using SeaLandings, the internet connection for one vessel was reported to cost about \$1,600/month. About one-third of internet use (\$530/month) is attributed to SeaLandings, with the remaining internet usage being attributed to headquarter office communication, observer reporting, etc. If something goes wrong with the system, the firm that works on the equipment charges \$250/hour. Estimates of average annual costs for repairs were not provided.

All of the additional computer duties increase the focus on hiring people with some computer skills. One captain noted that he needed to train his current mate to use the computer. Usually mates are hired from the employees working as part of the harvesting crew. On that captain's boat he noted that a little less than two-thirds of the crewmembers on the vessel had not completed high school. He said "it is easy to write things in a book, but typing/computer skills are necessary to use eLogbooks and SeaLandings".

On January 1st of each year catcher-processors have to install the updated software versions. This can create confusion for vessels who retrieve gear that they logged as "set" in the outdated software. Some captains work around this problem by retrieving all of their gear and processing all the fish before the update.

Some vessel operators were concerned about all the bookkeeping requirements that were imposed on fishing companies, and eLogbooks/SeaLandings was thought to be another layer in the reporting burden. However, this observation seemed to be more directed at the overall reporting burden and less at the IERS.

3.5 Costs to Processors

Costs related to the IERS that are realized by processors (e.g. shoreside processors or stationary floating processors) fall into three broad categories. Staff time spent learning to use the system, cost of equipment used to enter the data, and the time spent entering/checking the data. The change in costs associated with submitting electronic landings reports varies by processor and processing plants within a company. One processor indicated that their total costs associated with reporting and using landings data had decreased as a result of the eLandings system. Another processor indicated their costs had increased for reporting landings, but their costs associated with using that data internally had decreased. Overall, the representative of that firm felt total costs had remained relatively consistent before and after eLandings was implemented. As a result of the variability in cost changes reported by the plant representatives that were interviewed, it is not possible to determine whether costs increased or decreased overall or the magnitude of the change. However, based on the limited information gathered under this project, it appears that larger processing plants were most likely to benefit from moving to an electronic reporting system. Smaller processors or processors that entered large numbers of fish tickets may be more likely to experience increased costs.

3.5.1 Costs Associated with Training

Training costs described in this section are broken into two categories: training costs associated with the tLandings program, specifically in the salmon fisheries, and training costs associated with the eLandings program. To the extent possible, information is provided to show the changes in costs. However, the reader is reminded that the costs presented are provided for selected firms, and may not be representative of the industry as a whole.

Processors noted that much more training is needed now for tender operators than in the past. Prior to implementation of tLandings, the processors just gave tender operators books of paper fish tickets supplied by ADF&G, and the instruction manual and had them learn it on the job. Now they try to give all of the tender operators and crew training every year. Training is shorter if they have used tLandings before, but they are still given a refresher course.

Under the tLandings system one firm operating in Bristol Bay indicated that they spent approximately \$2,500 to train their 18 tender operators and crew. This cost included the time of one administrative staff person (about five days), two hours of training for each tender operator before the season, and about one hour of additional training for each tender operator during the fishing season.

Another operation did not indicate the costs, but did note that all tender operator crew were paid for training. They were compensated by the plant at their normal daily rate for approximately one day.

Under the eLandings system, plant staff also need to be trained. Specific cost estimates were not provided by processors because it is an ongoing process. Additional training is required whenever they have turnover in the positions that utilize the eLandings system. NMFS/ADF&G staff provide training to the users of the system, but staff still must dedicate time to learning the software programs. There is also time required to communicate with the agency staff if questions arise during the year. Additional training and costs are realized if the agencies or enforcement personnel determine the required information is being reported incorrectly. Whether these costs have increased or decreased relative to the LRS are unknown.

It is important to note that the three partner agencies have spent a lot of time and resources developing user manuals for all the components of the IERS. These manuals are available online for all IERS users to access. Using those manuals provides an excellent source of reference materials for learning programs and a refresher if questions arise during the year. On-line training modules have also been developed to provide plant and tender operators training opportunities on the IERS before “real” landings reports need to be completed. More recently, training videos have been produced for the tLandings and COAR reporting components with great success. Using those resources requires staff time, but does not require any additional expenditures for travel or software.

3.5.2 Costs Associated with Equipment and Supplies

Costs associated with equipment and supplies vary depending on the type of operation. Equipment costs considered include internet connections, workstations (including construction of work areas in the processing plants), laptops, magstripe readers, thumb-drives, and printers. Costs associated with supplies generally focus on paper, toner, and postage.

To outfit a tender operator to complete fish tickets under the LRS, they were given books of fish tickets and user manuals (both supplied by ADF&G). The tender operator had no additional expense other than the time to fill out paper fish tickets.

Using the tLandings system was estimated to increase the annual cost to outfit and operate a tender by \$1,000 to \$2,300, depending on the firm. Each tender using tLandings is required to have a laptop

(with the tLandings program loaded),¹⁶ thumb-drives, a printer, a magstripe reader, and sufficient paper and ink to print the required copies of the fish tickets. The initial setup costs could be as little as \$500 for a laptop and printer, but less expensive equipment will need to be replaced more often. One processor noted that tenders are not an equipment-friendly environment.

A processor representative noted that there is often not much room for electronics on a tender and a smaller, faster printer would make the process of printing fish ticket more efficient (\$500 for a printer would be a consideration for some of the busier/more reliable tenders). However, that additional cost is not justifiable for all tender vessels in their fleet.

Overall the annual cost of equipment on a tender was estimated to range from about \$1,000 to \$2,000. The cost depends on the types of computers and printers purchased. Costs also vary depending on how often the equipment needs to be replaced because of damage, failure, or simply being obsolete.

Because of the high volume of salmon deliveries, the cost of supplies increased for processors under the tLandings system. One person noted that each year NCR paper and toner is where most of the money is spent to outfit tenders. Another company estimated that they use one ream (500 sheets) of paper for every 150 fish tickets processed using tLandings. Toner costs used to print fish tickets on 500 sheets of paper was described as being greater than the cost of the paper. Processors also noted that shipping costs to get reams of paper to remote processors is also expensive. However, no quantitative estimates of shipping costs were provided. Processors also noted that prior to implementation of eLandings, all of the paper and printing costs, and at least half of the mailing costs were borne by ADF&G and NMFS.

To report eLandings in a plant, the costs vary substantially by the type of operation. All processors using eLandings need internet access, computer, and a printer. All of the larger processors typically have these resources already. Processors that take large quantities of deliveries from relatively few vessels likely did not have to purchase additional equipment. Processors that take more frequent deliveries of smaller quantities of fish may need to purchase additional equipment.

One processor that primarily took deliveries from the small boat fleet had to purchase two additional laptops and printers. They also had to construct two work stations in the processing plant to enter eLandings. These stations consist of a desk or podium for the computer/printer and sufficient space for the employee to work that and keep the electronic equipment from getting wet. These stations may be located in areas of the plant that are in proximity to high pressure water hoses. Ensuring water used to clean the plant does not reach electronic equipment and cause it to fail is a challenge. Having sufficient capacity to enter eLandings data is important because it keeps vessel deliveries from becoming too backed up and create tensions between the processing staff and the vessel crew.

3.5.3 Staff based Record Keeping and Reporting Costs

One of the major changes associated with IERS landings information is that data previously documented on paper forms and then submitted by processors to agency staffs to data enter into computer, are now being entered into the eLandings system by processor and tender vessel staff. It does need to be kept in mind that in most cases under the LRSs the industry staff also entered this same information into their own business operation system. To accommodate the requirement to enter data, the number of processor staff, their skill sets, and the time they spend key punching data has changed. Staff members assigned that task must possess computer skills required to complete the

¹⁶ ADF&G provides some thumb-drives with the tLandings program loaded so the processor does not need to provide one.

eLandings report. When looking to promote persons within the company it was noted that occasionally a person that could have been moved into the position, under the LRS, either did not want the job because of the computer requirements or was unable to obtain the necessary computer skills for the job. When looking outside the company for a candidate, computer skills are required in addition to the other skills required by the company for that job.

The impact on staffing costs varied greatly by firm. Because of the variation it is impossible to determine whether costs increased, decreased, or stayed the same for the industry as a whole. However, because the costs increased for some firms and decreased for others, the average change across all firms is unlikely to be large.

One processor that was required to complete about 50 fish tickets /IFQ reports a day was required to hire two additional part time staff during the busy season. Those two additional staff members tasked with eLandings cost about \$25,000/year, including wages and benefits. Other processors noted that they need staff available 24/7 to complete IFQ eLandings reports. This required additional staff or modifying the current staff's work schedule to accommodate night and weekend deliveries.

Another processor that primarily takes trawl deliveries of pollock, Pacific cod, and crab noted that the number of employees in the administrative staff has decreased by two at a savings of about \$120,000. They cautioned that not all of the savings were due to eLandings and that several other (not defined) factors were involved. The only cost increases realized by this firm was the purchase of two magstripe readers. Prices for the readers were not presented, but they typically can be purchased for less than \$100/per reader.

One plant stated that how regulations are being interpreted affected their work load. They stated that regulations indicate that a crab fish ticket had to be completed either immediately or within seven days after the offload is completed. Because crab IFQ landings are being processed in the plant 24/7 and eLandings records the time the eLandings report was started, agency staff can see that a landing is reported at 11:55 pm but the data are not entered into the computer until data entry staff arrives at the plant early the next day. Because of the difference between when the crab were delivered and the landings report was completed, they could be in violation. Under the paper ticket system the ticket could be filled out by production staff and signed, but the data would not be entered into the system until the next day when administrative staff arrived at work. This was not an issue under the old system, but now that administrative staff have to be available to enter the information into the computer system, it puts additional stress on those staff since one of the administrative employees must be at the plant whenever a delivery is offloaded.

Another processor noted that the move to eLandings was not a big change for their plant. They indicated that prior to implementation of IERS they entered their landings data into their computer system's proprietary software which in turn generated their own version of the fish ticket. With eLandings, they now use the report that is generated and do not need to reenter the information. They also noted that it took about the same amount of time to enter the data into the previous system as it now takes to enter for eLandings data.

One plant noted that prior to implementation of eLandings, they spent a lot of money (amount was not provided) on developing their own accounting system that was integrated with paper-based salmon fish tickets and used for over 10 years. Once the eLandings system was implemented, their new system was obsolete and could not be integrated into eLandings without substantial investments in programmers or in reentering all the data into the old system after it was entered into eLandings. That system had to be abandoned and they went back to using outputs from eLandings in MS Excel spreadsheets to track that information. In this case, the firm lost the investment in the program and future efficiencies that were built into its use.

Processors working with tLandings noted that the tender operators now key punch the data. This allowed one plant to eliminate a key punch position that historically was needed to enter paper fish tickets when they were delivered by the tender operator. That position was considered seasonal, but required a lot of overtime during the salmon season. They replaced that person with a salaried, full-time employee that spends a significant amount of time dealing with fish tickets, but who also deals with other IT issues.

3.5.4 Other Impacts and Potential Improvements Cited by Processors and Vessels

During the interviews with processors several issues were raised regarding components of the IERS that industry felt could be improved, or that were perhaps an unintended consequence of the IERS.

Observer Fees: One change identified was the calculation of observer fees that is provided in the eLandings system and it was noted that groundfish observer fees have added a lot of work for processors. Currently, there are small changes in the observer fee amounts that are calculated in-season and these changes require processors to adjust the payments at the delivery vessel level. This forces plants to issue small checks or collect small payments from all the vessel operators that had already been assessed fees in order to make the accounts balance. Groundfish processors believe that some relatively minor changes in the implementation of this system could make a big difference to the program.

Use of Recovery Rate Based Fish Weights for IFQ species: NMFS does not use the actual weight on the fish tickets for IFQ accounting of halibut and sablefish—they use a fixed recovery weight. Because of this, the invoices that are keyed in based on recovery rate information cause too many problems to be used by the plant. For example, sablefish deliveries are brought in dressed by the fishermen because the NMFS conversion factor to the IFQ weight works out in the fisherman’s favor.

Signatures on fish tickets: Obtaining signatures on fish tickets is sometimes a problem for plant irrespective of the reporting platform—paper or electronic. For example, a fisherman in one area that uses a tender does not come to the plant. He delivers to a tender and if the tender operators does not obtain the signature (too busy or simply forgets) it may be impossible to find the fisherman to collect the required signature. In those cases when the fish ticket is not signed it is sent to ADF&G highlighted saying “fisherman did not sign.” This can cause problems for the plant complying with regulations and ADF&G processing fish tickets.

Another negative comment heard by staff is that it may take more time for the persons delivering the catch to the tender to get their signed receipt (ticket). The increased time may be due to a lack of training (it may be that the tender owner has been trained but not the actual tender operator). Increased time at the tender causes frustration, especially when harvesters are in a hurry to get back fishing. Salmon fishermen in Bristol Bay, for the most part, will be fishing for nine hours during an opening and then off for three to four hours when the fishery is closed. Increasing their wait at the tender by an extra hour to an hour and a half reduces available fishing time and increases frustration because of potential losses in revenue.

eLogbooks Divert Attention Required to Drive the Vessel: Often the eLogbook program for catcher-processors is loaded on a laptop that sits in a place next to where the skipper pilots the vessel. Most of the time only one person is in the wheelhouse, so the skipper or the mate may have to take their attention away from piloting the vessel to enter information into the eLogbook. It was stated that it was easier to multi-task when running the vessel with paper logbooks. Increased electronic reporting requirements increases the need for an assistant in the wheelhouse, which is not feasible/practical much of the time. While this is seen as an unintended consequence of the IERS, operators indicated that this issue could the need for an additional crew member, resulting in higher costs

Time Spent on eLogbooks: Cather-processor operators were also concerned about the time it takes for the computers to process and transmit eLogbooks data. They were unable to estimate the additional time it takes to enter data into the eLogbook, but is thought to be more time than the paper logbooks. They noted that near the end of the season when there are lots of “pages” in the eLogbook, it takes about 10 minutes to process a return receipt. Captains considered that to be too long and would like to see the program process faster. Some vessels discussed adding a crewmember as a purser/QC person because the eLogbook workload is so heavy on the first mate. This company felt that the “bottom line” was that work load has increased since SeaLandings was adopted. When there are few bugs and problems, the workload was described as “manageable”. When there are issues the workload becomes “difficult”. There are times when the issues/bugs involved in SeaLandings could occupy another quarter or half of a person’s time. SeaLandings has increased recordkeeping time, but personal compensation has not increased. In addition, vessel operators described themselves as being more paranoid about the data.

3.6 Tenders

As stated under the processors section, the costs for tender operators are associated with acquiring a laptop, printer, toner, paper, magstripe readers, and other necessary supplies to use aboard the tender for the IERS. Depending on the structure of the business, the tender would either purchase the laptop themselves or more often the processor would provide the equipment and other necessary supplies.¹⁷ In most cases, the primary costs for tender operators are associated with installing, learning, and operating the tLandings system. Overall, the monetary costs for tender operators were very small.

Operating tLandings requires some training and practice for both the tender operators and the fish ticket clerk at the processor. If the tender operator is proficient using a computer they typically complete the tLandings reports themselves. Captains that do not have the necessary computer skills either get additional computer training or hire someone to complete the tLandings reports. Processing plant staff at one plant goes on each tender for about one hour to train the tLandings operator. After the initial training the plant staff still fields many radio and cell calls throughout the season to address questions as they arise. One company noted that no tender operator has ever declined the opportunity to work for their plant because of the tLandings system. However, they noted that it seemed some tender operators made using the tLandings system difficult just to make a point that they preferred the old system. There is a subset of tender operators that prefer to write paper tickets as they did in the past.

It was noted that gill netters do not use tLandings in some areas because of the functionality. In some cases the gill net vessels use trucks on shore to act as tenders. In these cases it was not as feasible to use tLandings, so they continue to write paper tickets.

3.7 Synthesis of Findings with an Emphasis on Benefits of the IERS

The following is a synthesis of findings by topic, as opposed to the previous sections, which summarized findings by user group. The previous section also focused on costs, while the findings in this section focus on benefits.

¹⁷ As a result, these costs are discussed under the processor’s costs and not the tender operator’s costs.

3.7.1 Data Entry

The IERS shifted much of the responsibility of data entry of fisheries landings information from agency staff to the first buyers of fish (i.e. processors) or to catcher-sellers, a shift from hand-written forms to computer-based reporting. This change reduced the amount of time agency staff are required to spend entering data into landings reports; the change in the amount of time processors spend entering data depends on how the IERS has been integrated into their internal accounting system. If processors take advantage of IERS data download capacity, they may be able to minimize the amount of landings data they enter into computer-based systems. If a processor does not use the IERS download capacity, they may be experiencing some redundant data entry effort—one time to submit data into the IERS, then one more time when they enter the data into their own accounting systems. In this case, it is assumed that the processor also entered landings data into their own accounting system under the LRS.

Agency staff indicated that the amount of time they spent entering data has decreased by 50 percent or more. The data they receive now is entered into the database in compliance with IERS business rules. As a result of the data being received in that pre-defined format, the data are typically complete and information that falls outside the business rules is corrected before it is sent to the agencies. Agency staff are still required to complete specific data processing steps—for example, adding batch numbers to the fish tickets.

As indicated above, changes in data entry time for processors/buyers has been largely dependent on their flexibility to alter their internal data processes to utilize the information they already enter into the IERS. Firms that have been able to adapt their accounting systems to utilize the data entered into the IERS either eliminated or greatly reduced the amount of data that needed to be re-key punched into their internal data base. Firms that use an internal system that cannot easily be linked to the IERS must re-enter the data necessary for their own systems. Over time it is anticipated that more firms will be able to utilize the IERS to access data for the internal needs. Adopting their internal system will require additional expenses on the part of processors, but many firms would incur costs as they update their systems with or without the IERS.

3.7.2 Reporting Redundancies

An intended and expected result of the IERS was to reduce or eliminate the requirements for industry to report the same information more than once. Many of the stakeholders interviewed indicated that the program has been successful in achieving this goal.

Requirements to report the same information were a result of the three IERS agencies each having their own data collection systems. The legacy information collection processes were designed to meet each agency's own internal information requirements. The lack of data sharing agreements between the agencies often required that the same or similar information was submitted to multiple agencies, so industry was required to comply with each agency's regulations. The IERS provides a single data entry point that allows the data being entered to flow from the processors/first buyers to the users of that data. ADF&G, NMFS, and IPHC can then access the same landings reports to extract the data necessary to meet their management mandate.

Another example of reduced reporting redundancies is the use of the IERS to generate the annual COAR that is required to be submitted by the first buyer of fish harvested from Alaskan waters. This reporting capability is just being made available. However, one processor using this reporting procedure as a test in 2014 noted that they were able to generate the report in about one day when it took about a week in the past. The IERS allowed this time savings by using the data entered by the processor to complete the eLandings reports throughout the fishing year to automatically sum and

generate the buying and production reports required for the COAR. In the past they would have needed to query their internal data or sum various buying and production reports to generate these data. Reporting much of these data a second time in the COAR could also result in errors, so the buying and production data do not exactly match the data reported on fish tickets and data reported to NMFS or the IPHC.

3.7.3 Data Sharing Agreements

Development of data sharing agreements by the partner agencies is also important to reducing reporting redundancies. The confidential nature of the data collected required each agency to impose measures to protect unauthorized release of the information. Those measures often prohibited the release of data to the other agencies, except for specific purposes. As part of the IERS and overall data program review, data sharing agreements were revised and enacted. Because of these data sharing agreements, each agency can rely on the other agencies to provide any data that are already being collected, thus eliminating their own need to also collect the information. Appropriate data sharing agreements are critical to enable the three partner agencies to develop and utilize the IERS.

3.7.4 Communication

Communication has generally improved under the IERS at many levels—1) within agencies, 2) between agencies, 3) between agencies and data suppliers, and 4) within companies that have multiple plants or vessels that process fish and report to the IERS. Prior to implementation of the eLandings System, agency staffs developed a program structure and an Operation Plan to clarify roles and budget. The structure of the IERS requires staff from the three partner agencies to work closely together to develop short-term and long-term goals and objectives for the program. These goals are developed during strategic planning annual meetings between key agency staff members. After the formal goals and objectives are developed, implementing those tasks requires frequent, but less formal meetings. Without effective communication, development and implementation of the IERS would be difficult or impossible. All partner agencies must have a common shared vision of the general structure of the program and must be willing to work together to implement that program.

Communication within agencies is also improved. The close-to-real-time data allow ADF&G staff members in the regional offices and at headquarters to have access to the same information. NMFS staff in various divisions and locations can also access the same data. This improves their ability to discuss management issues that may arise more efficiently and effectively.

Communication between the three partner agencies and the data suppliers is also critical. These discussions must occur before the program is implemented to gain a minimum level of acceptance, and must be ongoing to ensure stakeholders clearly understand how to comply with the program's requirements. Clearly communicating these concepts is essential to ensuring the reporting requirements are completed in a timely and accurate manner. It also helps minimize frustration of persons required to comply with the reporting requirements.

Communication between stakeholders and agency staff creates an opportunity for the exchange of ideas regarding changes that could improve the IERS. Since the program started, ADF&G, NMFS, and IPHC have been holding information presentations and seminars in various locations throughout Alaska and at commercial fishing shows such as ComFish and the Pacific Marine Expo, to disseminate information about the IERS. These presentations and seminars have been a valuable venue for the mutual communication of information and ideas regarding data reporting. Persons completing the eLandings forms are in a position to convey ideas for changes so the program better meets their needs without compromising the data quality. Freedom to communicate enables all stakeholders to feel they

are partners in the program. Industry members often indicated that they have increased respect for the agencies in general, and agency personnel in particular, through their interactions on the eLandings system.

Communication was also reported to have improved within processing plants and between the processing plants and the corporate headquarters, which may be located in different cities. For example, a company with offices in Seattle can see exactly what a plant located in Alaska is processing in terms of species, quantities, and products at any one time without asking plant staff to provide additional information. Various divisions within the plant can also see the same information. This allows production staff and front office staff to have access to the real-time and consistent information when it is uploaded.

3.7.5 Data Timeliness

As a direct result of the IERS, landings, bycatch, and production data are entered more quickly. Once the data are entered, verified, and uploaded, they are available to all persons with access to the data immediately.

Almost real-time access to the data is important for fisheries that operate under cooperatives and individual fishing quotas. These fisheries cannot have substantial lags between when the fish are harvested and available in the eLandings system to agency staff and quota holders. Substantial delays in access to the landings data render those programs impossible to manage and enforce.

One of the primary motivating factors for the development of the eLandings system was the need to monitor the Crab Rationalization Program. According to ADF&G and NMFS staff, without the eLandings system, that program could not be managed as it was approved, because the individual quota holder's balances could not be tracked in a timely manner.

The less complex, but equally demanding halibut and sablefish IFQ program also required real-time account debiting. The IFQ programs also need to accommodate consolidated/stacked permits in a single landing and therefore require a much more robust reporting structure to succeed—eLandings provides that structure. Prior to eLandings, a card swipe system was used to debit quota accounts in the Halibut and Sablefish IFQ Programs. The old card swipe system was “state of the art” when it was implemented, but improvements in technology allowed the eLandings system to incorporate IFQ catch reporting in 2007. The eLandings system was described as having improved the reliability and timeliness of monitoring IFQ and cooperative catch limits.

ADF&G staff also noted that management of lingcod bycatch in IFQ fisheries prior to eLandings was far more difficult. Staff needed to wait for fish tickets to be submitted to the local office of ADF&G (up to seven days) and then wait until data were entered into the fish ticket database. Information now is available as soon as the landing has been saved to the eLandings Repository database. The timeliness of the data provides valuable information for determining fishery closures, providing the tools for better management of the resource.

3.7.6 Data Usefulness

As described above, the timeliness of the data collected under the eLandings system make it more useful to fisheries managers. It allows for better management of the state and nation's resources. It also allows fisheries managers to implement programs that allow efficiency gains to be realized by harvesters and processors, while providing the tools for agencies to better manage the resources under their authority. The eLandings system also provides data that are more useful to other stakeholders as well.

Private firms that are hired to help harvesters address bycatch issues and provide cooperative management support are able to better provide that support. One example given was the ability to provide 24/7 notifications of bycatch hot spots. The ability of the fleet to avoid Chinook salmon Prohibited Species Catch (PSC) and halibut PSC are becoming more critical as the overall PSC limits are being reduced. Reaching a PSC limit can result in fishery closures that reduce revenue for harvesters, processors, crew, and communities. The ability to notify industry when an area has high bycatch rates can help reduce the amount of bycatch and increase the revenue generated from fishing. Prior to eLandings, the hot spot reports took much more time to generate and they could be delayed if the information was not received quickly. The structure of the eLandings system has allowed the notification system to be automated, which improved the usefulness of the information.

The structure of the eLandings system also provided the ability to link all landings data for a trip to quantify effort. Prior to eLandings it was difficult or impossible to link data on bycatch of groundfish or lingcod within landings for halibut. Under the LRS, lingcod and groundfish landings on halibut trips were reported on separate fish tickets from the halibut. Linking the two tickets was not always possible. As a result, fishery managers could not always determine if a lingcod or groundfish delivery was the result of targeting those species, or if it was bycatch on a halibut trip. The ability to make that determination enables fishery managers to determine the amount of those species that can be expected to occur in the halibut fishery and the amount that can be made available for a directed fishery.

The incorporation of halibut data within the eLandings repository database has proved to be very helpful and informative for in-season ADF&G managers as well as CFEC staff in their effort to establish fisheries value.

The eLandings system can also be used to fulfill additional reporting requirements. For example, as noted above, the agencies have been developing an application that allows processors/first buyers of fish to complete their COARs more quickly and easily.

3.7.7 Data Errors

The business rules built into the IERS are an important factor in reducing data entry errors. Many of the data fields are subject to these business rules. The information entered and submitted in the eLandings System is validated against database tables and programmed business rules. If the information submitted passes validation, the program will accept the information. If the information entered in a field fails validation, the eLandings System will send a message to the user that identifies the specific problem. Examples of fields that use these validation systems include: the statistical areas, vessel numbers, permit numbers, species codes, product codes, and others. As a result of the many business rules implemented there is a much smaller chance of misreported data or transposed data entries. Fixing these problems at the time they are entered into the system greatly reduces the time required to find and correct these errors later. It also reduces the possibility that incorrect data will be used to make future management decisions.

Another issue that was raised repeatedly was that the data the agencies received were easier to read. When the reports were submitted to the agency under the LRS, they were a carbon copy of a hand written report, or a fax of a hand written report. Often some portion of the report was difficult to read. Agency staff were then required to decipher the information or ask the person submitting the data to clarify the information. Either of these processes was time consuming and could result in data errors. All of the reports submitted using eLandings/SeaLandings are legible, which reduces the chance that incorrect data is entered because the reported information was misinterpreted.

Data errors could also result under the LRS when calculation errors were made. For example, processor staff and agency staff were required to sum all the pounds reported on fish ticket. If a calculation error was made, the total would be incorrect. Finding and correcting those errors was time consuming and often frustrating when trying to get all the fish tickets entered into the system. These errors do not occur under the eLandings system, because the program automatically sums all the appropriate fields and generates a total. Processors report that they independently check their tally sheets against the sum of weights reported in the IERS and are better able to find and correct errors before they are submitted.

3.7.8 Missing Data

Under the LRS there was always the possibility that fish tickets or production reports could be lost or misplaced. Finding the missing reports or even recognizing that reports were missing often took considerable time. Staff would need to contact other agency staff to find the report or contact the person submitting the data. Under the eLandings system, a report that is entered into the system is always available. Staff noted that lost landings reports are no longer an issue.

3.7.9 Data Access

Information entered into the eLandings system is much easier to access. Data can be viewed by agency staff given access through software loaded on their computer. Stakeholders can also use the eLandings web application interface to search for and retrieve finalized landings report and production report data from the eLandings database. Multiple Landings or Production Reports can be extracted from eLandings at the same time. The extracted data reports can be easily imported into spreadsheets. Users also have the capability of downloading and customizing fishery-specific landing and production report templates pertinent to the end users' needs within the restrictions placed on accessing the data.

In their interview, CFEC staff focused on the availability of halibut data incorporated into the landing report, rather than being provided as a separate dataset well after the landings occurred.

Another benefit identified was that fishery observers can access fish ticket data after they leave the processing plant. Prior to eLandings access to the fish ticket data, the observer would need to get a hard copy of the fish ticket before the vessel left the plant. Preventing the vessel from leaving the plant could be a source of tension between the observer and the vessel's crew. Under eLandings, the observer program staff can access the fish ticket information and provide that to observers. Observer program staff can also compare observer data in the ATLAS¹⁸ database and eLandings data to both reduce the amount of time it takes to debrief observers and allow for a better and more thorough debriefing process. Under the LRS, much more time was spent comparing observer and industry reports.

The eLandings system allows contractors with the fishing industry to automate the data download process to run at night, thereby reducing the time they spend accessing the data and making the updated data available when they arrive at the office in the morning. Prior to eLandings they needed to log into the various computer systems that stored the data and manually download the information.

¹⁸ ATLAS is a Java client for data entry by observers while they are in the field and submission of the data to the Alaska Fisheries Science Center via satellite.

3.7.10 Data documentation

Development of the eLandings program has improved data documentation and has advanced the metadata library. eLandings user documentation is easily accessible and available.¹⁹ Various stakeholders indicated that improvements to the data field documentation have been very helpful. Under the LRS, codes were available, but from various locations and the codes changed over time. The new system embeds many of the codes in the program using business rule to enforce their appropriate use. For example, 17 separate eLandings code-tables are available.²⁰ These tables cover a variety of area, species, disposition, port, etc. codes that are needed to complete the eLandings reports.

3.7.11 Tender Operations

Implementation of the tLandings system was generally viewed as a substantial improvement by all stakeholders. The only group that appeared to be generally opposed to the tLandings system were those tender operators that had limited computer skills. All other tender operators, processors, and agency staff indicated the tLandings system was beneficial. Processors noted that the implementation of the tLandings system improved their tender operations' efficiency. Those efficiencies resulted in decreased costs. Tender operators with no more than a minimal level of computer knowledge were reported to like the new system.

Training of the tender operators on the tLandings system has been important and is typically provided by the processors where the tender delivered. ADG&F would typically provide training to the processor's staff and they would in turn provide a brief training session to their tender operators. Typically a full day of training has been used by processors for tender operators that were new to the system. Processors will often ask tender operators to repeat the training in subsequent years. Even providing an hour training session for experienced tender operators appears to decrease issues reported with the system.

3.7.12 Training

Providing adequate training is critical to the success of the IERS. Training sessions are typically provided prior to the start of fishing each year. Additional training sessions are provided as the need arises and budgets allow for more training. Providing training opportunities each year is important because turnover in the positions responsible for entering data into the eLandings system is relatively high. If the person with the knowledge of the eLandings system leaves a firm, agency staff often need to train the new staff person. Training generates greater acceptance of the eLandings system and reduces frustration of the users. It also reduces the errors that need to be corrected in season.

3.7.13 Ongoing User Support for IERS

Processors and data users noted that agency staff are very accessible when questions arise. Agency staff noted that providing 24/7 support through help desk contracts allows people completing eLandings the opportunity to ask questions at any time. The help desk support enables basic questions to be addressed and more complex questions to be forwarded to agency staff. The help desk helps to reduce processing staff employees' frustration when they have difficulty with the system. It also

¹⁹ <https://elandings.atlassian.net/wiki/display/doc/eLandings+User+Documentation>

²⁰ <https://elandings.atlassian.net/wiki/display/doc/eLandings+Code+Tables>

improves the quality of the data entered into the system, making everyone's job easier when it comes time to use the information provided.

It is also important that users of the eLandings system are comfortable asking questions. Almost everyone interviewed indicated they were very comfortable asking agency staff questions whenever they arose. This open policy was thought to improve the communication between all stakeholders in the program and made stakeholders feel as if they have some ownership in the program.

4 Conclusions with Respect to the Goals and Objectives of the IERS

Several goals and objectives were identified by the three partner agencies when the IERS was envisioned (ADF&G et al. 2012). The conclusion section of this paper will review the nine goals and objectives identified by the agencies, and describe whether the responses of the stakeholders interviewed and other available information indicate they have been achieved.

1) Collect timely commercial catch statistics that meet the needs of agencies tasked with oversight, management and enforcement

All the interviews conducted with state and federal staff from various agencies indicate that the IERS has been very successful in collecting commercial catch statistics that meet their needs. The needs for data vary widely across the various agencies and departments, but the common theme was that easier access to more timely data has allowed them to more successfully complete their tasks.

More timely and accurate data have allowed ADF&G staff to better manage fisheries under their authority. Data are more accurate because staff can account for bycatch of lingcod, rockfish and other groundfish in IFQ fisheries. Under the legacy system, bycatch in the IFQ fisheries was reported on separate fish tickets and could not be linked with the IFQ species catch. For example, the amount of lingcod or Demersal Shelf Rockfish (DSR) in the halibut fishery can now be tracked to determine the amount available for the directed fishery. In the DSR fishery, staff can determine the amount that is available for a directed fishery in outside waters, by estimating how much will be taken as bycatch in the halibut IFQ fishery. That estimate varies based on the average DSR bycatch in the halibut fishery using a 5-year bycatch average. Once the bycatch needs are determined, staff decides whether the fishery will open to directed fishing.

Data are also timelier because, prior to eLandings, staff would need to wait for fish tickets to be submitted and entered. The information is now available for use as soon as the landing has been saved to the eLandings Repository database and provides valuable decision-making information.

NMFS is able to manage IFQ fisheries and fishing cooperatives that would not be possible without electronic reporting. These fisheries require accurate and close-to-real-time data to monitor harvests of individual vessels, persons, and cooperatives. These types of management programs are widely considered critical to reducing bycatch and allowing the fleets to operate efficiently. Without the electronic reporting, these programs would not have been implemented because they could not have been successfully managed.

The ability of each agency to quickly pull data into their systems has also been beneficial. Those components provide an efficient way to merge data in each agency's internal systems and summarize catch. This is useful to in-season ADF&G and NMFS management staffs. The assignment of management areas and programs to the data has also greatly improved staffs' ability to quickly and easily extract the relevant data for their specific needs. The information availability allows in-season management decisions to be made with close-to-real-time data.

The eLandings Agency Interface application has been helpful to all agency staff, including Alaska Wildlife Troopers and NMFS Enforcement. Prior to eLandings, enforcement staff would place information requests with ADF&G. The requests were burdensome and used only when necessary. The Agency Interface allows enforcement staff to query the data from their computer and use the information to determine where to deploy assets, conduct research on potential actions that may be necessary, and better understand the fishing activity at a particular time. All these uses allow enforcement agencies to be more effective with their limited resources. Timely access to the data also

allows enforcement staff to review information and, if a processor is incorrectly reporting the catch, respond quickly and address the problem to avoid the need for greater intervention.

Linking the data collected with the IERS and the federal Observer Program data in a timely way has been beneficial. Prior to eLandings, the catch data could not be monitored and compared to observer reports in a near-real time. That access to the data allows data discrepancies to be identified while the observer is still at the plant or on the vessels. Correcting the problems early improves the observer data.

2) Reduce redundant reporting

Redundant reporting has been reduced under the IERS by enabling reporting to all three fishery management agencies at once. The Shoreside Processor DCPL has been replaced by eLandings. Prior to eLandings, processors were required to report catch by individual vessels in both their fish-ticket reports and in the DCPLs. Now the required information is entered only once into eLandings, and that information is used to generate the information previously reported in the DCPL and in fish tickets.

In addition, the software provides features that eliminate the need to reenter the same header information into each landing report and eliminating some requirements to submit the same information to different agencies. The eLandings account holder's User ID, Processor Company Name, telephone number, and email address are auto-filled on the header page; it also lists the Port of Landing associated with the processor. In addition, the eLandings system allows users to enter all of the federal and state permit codes associated with their operation. These codes include the ADF&G processor code (commonly referred to as the "F code"), Federal Permit Number, Registered Buyer Number and Registered Crab Receiver number. All these license/permit numbers are provided in drop-down lists on the pages they are required to be supplied. The codes selected then auto-fill the values for these fields. This eliminates the need for the user to key in the various codes each time an eLandings report is generated.

The electronic logbook (eLogbook) in SeaLandings is required for catcher-processors and motherships that use flow scales. Daily logbook entries are submitted to NMFS from SeaLandings via email with production or landing report transmissions. The information entered in the eLogbook is available for use by vessel and agency staff. The paper logbooks had to be filled out by the skipper or mate and were physically sent to NMFS after the logbooks were complete or the season ended. The information was useful for enforcement on the vessel, but before it could be used for most management issues, it had to be key punched into the data base. Often the agency did not have the resources to enter all the information on the paper forms, so they were stored in warehouses. Now that the information does not need to be hand written and then entered into the data base, it is more useful and does not require redundant entering of the same information both paper and computer forms.

The eLandings system allows the user to enter both groundfish and IFQ landings under the same landing report. Once the initial groundfish landing report is completed, the eLandings system allows the user to create an IFQ report. The IFQ report can then be submitted. Completing the IFQ and groundfish landing report in the same session eliminates the need to complete two completely separate reports. There are efficiency gains associated with not needing to reenter basic header information twice as well as tracking, printing, and mailing the two individual reports to different agencies.

3) Develop a data collection system that considers the business constraints of industry

Many of the features of the IERS were developed to address business constraints of the industry. The business rules built into the program allow industry to easily determine whether invalid information is being entered into the system. For example, only valid permit numbers may be keyed into the system, and similarly only valid codes for fishery reporting area may be entered. In addition, the eLandings system automatically sums the pounds of the various species, production, and disposition codes. By requiring that data entered into the systems meet the basic business rules of the management regime, mathematical errors and other data entry errors are minimized.

4) Provide paper documentation to fishers, processors, and management agencies

The eLandings application allows users to fulfill off-load record keeping requirements for ADF&G fish tickets, NMFS RAM IFQ reporting, IPHC halibut reporting, and NMFS In-season Management production reporting for groundfish. Using eLandings, processors/fish buyers are able to document the full off-load as a landing report and generate PDF files ready for printing, signature, and distribution to the appropriate persons and agencies. Therefore, the IERS has been very successful at meeting the requirement to provide documentation of catch to fishers, processors, and management agencies.

Paper documentation is still important for various reports including Fish Tickets. The ADF&G fish ticket continues to be the required form to document commercial harvest and comply with the Alaska Fish and Game Laws and Regulations. Those regulations require that a printed copy of the fish ticket must be signed. The IERS generates a paper copy of the fish ticket that is signed and sent to the agency for official documentation of the landing. If regulations regarding the need to archive paper fish tickets are modified, the IERS could be modified to allow for electronic signatures and electronic archiving of fish tickets.

5) Allow multiple landing documents to be joined by a unique trip number

An important aspect of the IERS is that each landing report is assigned a unique number that is generated by the eLandings system whenever a new report is created. The goal is then to generate a unique trip number to determine which landing reports came from a specific trip. This small, but very useful piece of information can be utilized by fishery managers to improve their in-season management, and allows policy makers to make more informed decisions. For example, the trip number can be used to identify IFQ landings and the bycatch of groundfish and lingcod that occurred on those trips, as well as quantify fishing effort. Prior to the eLandings system, a separate landing report was often generated for the IFQ species and the groundfish. Linking those landing reports was difficult, time consuming, and not always accurate. Trips could be estimated based on the day the delivery was made, but if vessels took multiple trips in a day or offloaded over two or more days, the information would be incorrect. The eLandings system generates a trip number and agency staff have a mechanism in the agency desktop to review and edit the trip numbers. However, the current trip numbers have not been used successfully across all agencies, and the IERS development team is currently reviewing and making improvements to the algorithm for generating trip numbers as well as the process for agency review.

6) Improve data quality

All persons interviewed stressed that the overall quality of the data has improved. Agency staff noted that the eLandings system has created a structure and incentives for persons submitting the data to provide complete, accurate, and legible data. Agency staff also noted that when industry uses the eLandings/tLandings data for their own purposes, and are satisfied that the system works well, they

have a vested interest in ensuring the data are of highest quality. Prior to eLandings, the information submitted was often not complete or codes were entered incorrectly. The business rules imbedded in eLandings have greatly improved the issues associated with submitting incomplete landing information. Submitting the data electronically has eliminated the issues associated with receiving data that are not legible. Drop down lists for various fields and verification tables for legitimate codes have helped to reduce the incorrect reporting of species, gear, area, products, disposition, vessels, permits, and processors.

The eLandings program also eliminates math errors associated with summing the pounds reported in various fields. Prior to eLandings, these arithmetic operations were performed by hand or with calculator by processing staff. These totals then had to be checked and double checked to reduce the chance of an error. Because these totals are automatically summed within the eLandings program, that specific type of error does not occur.

Correcting errors in the data under the LRS was time consuming and frustrating for data suppliers, agency staff, and data users. Agency staff would often need to request that data suppliers provide corrected information or make reports legible. Users of the data would find errors, but the process to get corrections into the underlying databases was often sufficiently cumbersome to prevent all the changes from being made. Under the eLandings system, fewer errors are made, and as a result the errors that do occur are easier to detect and correct.

The eLandings program maintains an audit trail documenting all changes to submitted reports, including when data were modified and by whom.

7) Adhere to regulations

The IERS was developed to adhere to all reporting regulations that have been implemented by state and federal agencies. Data collected under the eLandings are collected from processors and fish buyers that must submit the information to the eLandings Data Repository within specified timelines.

8) Adhere to confidentiality requirements

Confidentiality requirements are critical and are taken very seriously by the three partner agencies. Proprietary business information is collected through the IERS. That information is protected by state and federal regulations from release to anyone that is not authorized to access the data. The IERS has built in strong controls with respect to the persons that can access the data.

Persons submitting data to eLandings must be given permission to access the system. Prior to using the eLandings system to report landings or production data, each individual must request authorization to use the system and reserve a UserID and password. A UserID will only be activated after a signed registration form is submitted and approved. Permission to use the eLandings system only gives users access to their own company's data.

The Agency Desktop allows approved staff members from the various partner agencies to access the eLandings data repository. Staff can download and install the Agency Desktop on their computer. Once the Agency Desktop is loaded on their computer, they are required to use their personal UserID and password to access the confidential data. Only when their user ID and password are accepted, will the Agency Desktop open. The use of unique IDs and passwords provide greater control and documentation regarding what staff are allowed to use the data and when and how it is being used.

Other users of the data can only access eLandings data if they have been given permission by the partner agencies or persons that have submitted data. These persons also must submit an application to use the data, sign the confidentiality agreement form, and set up an account with ID and password

to access the data. Persons in this category include contractors hired by the industry to help monitor catch and bycatch in various cooperative management programs. Alaska Wildlife Troopers and NMFS Enforcement are provided with read-only accounts.

The eLandings program implemented an audit trail to identify modifications of submitted data, an important component to a multi-agency system.

9) Development of a robust and agile reporting system to meet current and future reporting requirements for agencies and industry.

The IERS has been developed to meet many of the current reporting needs. It has been stressed by agency staff that many of the current management systems requested by stakeholders and implemented by the various agencies would not be possible without the IERS. The system has also been designed to provide sufficient flexibility to address future reporting requirements that may arise. However, changes to the complex IERS often require substantial amounts of programming time and money. Therefore, while the system is robust enough to accommodate many changes that could be envisioned, budgetary concerns (time and money) are often the limiting factor for change. It is also important to understand that industry develops their internal reporting systems around the current reporting structure. Any changes to that structure may alter the effectiveness of their systems. As a result, some members of industry may not benefit from changes to the reporting structure. The agencies have attempted to combat that problem by developing data extract tools that allow the eLandings data to be output into a variety of data formats and structures. Industry can then import those data into their systems.

Both members of industry and agency staff expressed interest in expanding the fisheries that use the eLandings system. Several fisheries still require landings to be reported on paper fish tickets. The agencies will continue to consider adding fisheries as their time and budget allow.

5 References

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Appendix A: Processor Interview Questions

Introduction

The Interagency Electronic Reporting System (IERS) is a fisheries data collection system involving the three agencies (NMFS, ADF&G, and IPHC) that manage commercial fisheries in Alaska. Traditionally, reporting of catch, discards, processing, and value has involved a combination of paper forms and electronic reporting and was not integrated across agencies. The management agencies have worked together to implement the IERS, with a primary goal of developing a system to collect timely information and eliminate redundant fishery reporting to management agencies. The three agencies have also worked together to implement a set of business rules that must be followed to help improve the quality of data initially entered into the IERS and speed the data entry process.

To better understand the costs and benefits of the IERS, the three agencies have contracted with Northern Economics, Inc. to develop several case studies of data submitters, data collectors, and data users. The report will not identify any stakeholder without prior approval, but will use the information collected to describe a class of stakeholder and how that group was impacted by the move from the Legacy reporting system to eLandings.

We are providing this set of interview guidelines in advance, because we assume you will want to know what we will be asking you about, and because you may wish to do some research in advance of our meeting. You will see that we have added space after each question to add notes into this word document. Marcus and Darrell will be using these same forms for entering notes during the interview, and we have added these boxes for both our convenience and yours. While we are not formally asking that you provide a written response to these questions, please feel free to add your own notes in these areas. Also note that we will gladly accept your written comments, if you wish to provide them in electronic form by email, or key drive if the interview takes place in person.

The following questions help us understand the way your company uses the eLandings System:

- 1) What eLandings applications and features do you currently use?
 - a) eLandings to report catch and production data for shore-based processors
 - b) Landings Web for IFQs
 - c) SeaLandings
 - d) eLogbook
 - e) tLandings
 - f) Observer Fees – eFish
 - g) COAR via Electronic Reporting
- 2) For what fisheries do you use those applications?
 - a) Do you use all of the applications for all of the fisheries in which you are engaged?
 - b) Do you use some of the applications for some fisheries and other applications for other fisheries?
- 3) How long have you been using eLandings to submit data?
- 4) Do you extract eLandings data for use in your own landings data management system?
 - a) If yes, do you use Data Extract Tools available from eLandings Web?

- b) If yes, do you use a 3rd Party application?
 - i) Catch Manager II?
 - ii) Other 3rd Party App?
 - c) If yes do you use a proprietary application developed explicitly for your company?
 - d) If no, please discuss some of the reasons why you don't, and what it might take to get you to move in that direction.
- 5) Please help us understand the processes and procedures you used in the "legacy" system and now under eLandings:
- a) Describe your pre-eLandings reporting process
 - b) Describe your post-eLandings reporting process
 - c) What were the major changes and how have they impacted your business?
 - d) Has the auditing process of fish tickets changed in your company pre and post eLandings? For example, did you or do you audit all mathematical calculations documented on paper fish tickets/scan for accuracy, completeness and legibility?
- 6) How was data entered into your own business applications?
- a) Prior to eLandings?
 - b) Under eLandings?
- 7) How have the number of staff and the time entering the data changed pre- and post-eLandings?
- a) Have the qualifications of the staff used to enter data and providing landings reports changed? Please discuss.
 - b) How has training changed to comply with the new data entry requirements?
- 8) How has data quality changed pre- and post-eLandings?
- a) Has the amount of time editing data changed?

These next four questions ask about the costs of migrating to the eLandings System

- 9) Equipment and Supplies Costs
- a) What are your equipment costs associated with tLandings/eLandings/SeaLandings/eLogbook?
 - i) If you include internet connection, workstations, etc., provide an estimate of the percentage that is attributed to reporting these data. (Note: to use tLandings, each tender is equipped with a laptop, magstripe reader, mouse and laser printer.) Compare these costs to the legacy system of reporting (how did equipment costs change?).
 - b) Have you experienced changes in office supply costs (e.g., eLandings and tLandings often results in the processor using more printer paper and laser printer toner)?
- 10) Estimate your training costs associated with eLandings (office staff) and tLandings (office staff and tender operators)
- 11) Estimate software costs pre and post eLandings (including internal software associated with eLandings). This should include both software purchases and software development. If costs have increased, what is your perspective on whether the total benefits are greater than the costs?

- 12) Please provide an indication of the difference in personnel costs for staff used to comply with state and federal data reporting requirements. This estimate can be rounded to the nearest \$10,000.

Some final discussion points about costs and benefits of the eLandings System.

- 13) After initially implementing the new landings reporting system, have you noticed changes in costs/benefits as the program has matured and your business has become more familiar with its use?
- 14) Is your use of eLandings and tLandings fully integrated into your business, or for some applications do you still rely on a Legacy system?
- 15) In general, has moving to tLandings/eLandings/SeaLandings/eLogbook changed the company's attitude and approach to recordkeeping and reporting?
- 16) Has the new system had any impact on you working relationship with the data collection agencies?

Appendix B: Agency Interview Questions

- 1 Can you describe how you process conventional fish tickets vs. eTickets?
 - a. What percentage of conventional fish tickets vs eTickets does your staff process?
 - i. Salmon
 - ii. Groundfish (none)
- 2 How has moving to the eLandings system impacted your job or the work you do?
- 3 How has data processing procedures changed with the implementation of eLandings?
- 4 After the initial implementation issues were resolved, have you found that eTickets data processing has increased or decreased staff efficiency?
- 5 Can you quantify the change?
- 6 Have there been changes in the amount of time you and your staff spend processing eTickets?
- 7 Have there been any staffing changes as a result of implementing eLandings?
 - a. Decreased?
 - b. Increased?
- 8 How has the data quality of landing reports changed pre/post eLandings?
- 9 Does your staff spend more or less time reviewing and editing fish ticket data? In-season/post-season?
- 10 Has the accuracy of the fish ticket data submitted to ADF&G from industry 1) gotten worst, 2) improved, 3) remained the same.
- 11 Has the number of data errors or missing data changed for the better/worse?
 - a. If improved, can you estimate the change as a percentage?
- 12 How has the data availability changed pre/post eLandings?
 - a. (Do you use OceanAK to monitor data?)
- 13 How has data timeliness changed pre/post eLandings?
- 14 Have management decision-making changed in any way as a result of tLandings?
- 15 Can you identify some of the benefits and some of the challenges associated with eLandings once the initial implementation was finished?
- 16 Has the eLandings system changed the relationship between the eLandings partner agencies you interact with?
- 17 How has your relationship with the industry staff that submit reports changed or been effected by the implementation of eLandings?

- 18 We are aware of staffing costs, IT infrastructure and user support/training costs to implement and support eLandings, but are there other costs or impacts to the agency that we need to consider or have missed?
- 19 Do you receive feedback from industry about the tLandings/eLandings program? And about conventional fish ticket reporting?
- 20 Please share any other comments you might have.

Appendix C: Summaries of Interviews with Stakeholder Groups

Appendix C provides a summary of information collected from interviews with stakeholder groups. The groups include each of the three IERS agencies (ADF&G, NMFS, and IPHC). Also included are summaries of information from affiliated fishery management agencies including NMFS Office of Law Enforcement/Alaska Wildlife Troopers, the CFEC, the Alaska Fishery Information Network (AKFIN), and the NPFMC. Finally, we provide summaries of four industry groups: Harvesters, Processors, Tender Vessels, and Contractors Working with Industry.

Stakeholder Group 1: ADF&G

Paper Fish Ticket reporting and processing—the Legacy System

Paper fish tickets are created at the local seafood processing facility, at buying stations, and on board tenders. ADF&G provides paper fish ticket forms, each uniquely numbered and specifically developed for each major fishery. The forms are completed by hand, following regulations outlined in Alaska Fish and Game Laws and Regulations, 5AAC 39.130. The completed ticket is signed and submitted to the local office of ADF&G within seven days. Each seller of seafood products must present a CFEC License to the licensed buyer, usually a seafood processor. Each first purchase generates a fish ticket.

If IFQ quota shareholders join together to fish their individual quotas, each quota shareholder is a seller of product, which generates a separate fish ticket. This process is commonly referred to as stacking permits. Stacked permit landings generate multiple fish tickets, ranging from two to ten. Joining these tickets together with a single trip identification is extremely difficult as it is a manual process.

ADF&G staff followed a general protocol for processing paper fish tickets before and after eLandings was implemented and these differences between the two protocols are substantial. Paper fish tickets are still processed by ADF&G as the Department has not fully implemented electronic reporting for salmon fisheries and has not yet developed reporting for other shellfish, non-crab, and herring. As previously mentioned in this report, ADF&G processes approximately 250,000 fish tickets annually. The challenges to implementing electronic reporting in such a large and diverse state with over 600 licensed processors are significant.

The goal of fish ticket processing, irrespective of the reporting platform, is to create an accurate electronic record of all commercial fishing activity and to establish an archival structure for both storage and retrieval of fish tickets, as these are legal documents.

The general procedure followed for processing paper fish tickets requires that each handwritten fish ticket be reviewed for legibility, completeness, and accuracy by agency staff. Required data elements that must be review included:

- Vessel name and identification number
- Name and fisheries permit number for the vessel operator
- Name and fisheries business license number of the buyer
- Fishing dates
- Area of harvest
- Gear, and in some fisheries, effort

- Species/delivery condition at the point of landing/weight, and in some fisheries number of animals
- Signature of both the buyer and the seller of the product
- Additional data elements for specific fisheries

Fish tickets that are either illegible or are missing data elements require agency staff to contact the processor to obtain the necessary information. In some cases, the fish ticket records are returned to the processor for immediate review and correction. Once the fish ticket(s) are legible and complete, staff enter all the landed pounds reported on the fish ticket into a spreadsheet to ensure they add up to the processor's reported total. Depending upon the fishery, each report may be compared to other observations, such as a logbook, a dockside vessel operator interview, observer data, or dockside sampling efforts. The report may be modified by agency staff, following established procedures.

In the groundfish fisheries, catch and bycatch of individual species are reviewed to determine if any bycatch or trip overage occurred. Edits to paper fish tickets occur prior to data entry, documented on the ticket. The edited version of the fish ticket is then data entered.

Fish tickets are then grouped in lots (between 50 and 200) and numbered with sequential ticket numbers. Each lot of tickets is considered a batch. Data are then entered into the electronic database. Completing all these steps requires staff to review each fish ticket two or three times to finalize all the information verification and data entry. Following data entry, a report of all data elements within the batch is printed and compared for accuracy against the source document. This procedure is done to verify accurate data entry and as a substitute to double data entry.

The Bristol Bay salmon fishery is extraordinarily short, with high volume, and generates approximately 80,000 records. Catcher vessels do not sort salmon species, rather they report salmon poundage as "mixed salmon species". Local ADF&G staff enter the mixed species weight and later provide an average percentage of species composition by area and date to ADF&G Computer Services Division to perform a mass update of all mixed salmon records to unique species/pounds. This process is time consuming and tedious, and can only occur months after the fishery has ended.

IERS fish ticket reporting and processing

Creation of the landing report fish ticket may occur at a local seafood processing facility, using the eLandings web application, or it may be created on board a tender, using the tLandings application. In either case, one time data entry of the landing report occurs with extensive validation and automated business rule review, prior to storage within the eLandings repository database. Fish tickets may only be printed after successful submission to the database. Each ticket generated within the IERS is assigned a unique fish ticket number and a landing report number. The ticket is printed, signed and submitted.

If the landing is associated with an IFQ species, the IFQ report can be documented, generated and submitted with the fish ticket, in sequential steps, creating both a fish ticket and an IFQ report. If more than one IFQ quota shareholder join together to fish, commonly called stacked permit fishing, all permits are documented on one eLandings landing report, which then generates multiple fish tickets. All fish tickets are assigned a single landing report and trip number, facilitating the easy determination of fishing effort in these fisheries. The landing report number identifies the landing—the trip. The fish ticket number identifies the unique sale.

Tickets are submitted to the local office of ADF&G within seven days, but as soon as the data are stored in the eLandings repository database, they are available for review and are primarily used to

quantify and assess the catch and catch rates. This timely availability of information was an identified goal when the IERS was being developed.

Once the tickets have been submitted to the local office of ADF&G, the data process is much simpler, but the goal remains the same—to verify that the data are accurate and create a retrievable archive for each ticket.

Tickets are reviewed to make certain they meet regulations with a focus on the capture of the CFEC permit and signatures. Each fish ticket is reviewed, with a focus on accuracy. To provide an example, a date or an area of harvest may pass validation, but it may not be accurate. The ratio of pounds to number of fish (average weight) is also reviewed. Some of these reviews are completed as quality assurance reports to identify reporting issues, as opposed to scrutiny of individual tickets.

Groundfish, salmon troll, and crab landings require additional staff review as many of these fisheries have additional observations and bycatch/trip overage assessments, as well as complex harvest code assignments. Each landing is processed individually. While the process remains time consuming, it is still expedited. Edits to the electronic record occur within the eLandings repository database using the Agency Interface application. An edited version of the fish ticket can be printed, reflecting modification to the ticket.

The IERS maintains an audit trail of all modifications to reports—documenting who submitted the report and when, and who modified the report, and when. This is the only audit trail that is maintained by ADF&G for these records.

Processing of most salmon tickets is a streamlined process. To accommodate the high volume of fish tickets, ADF&G staff developed a feature within the Agency Interface application to expedite processing of salmon tickets. To date, approximately 1.5 percent of electronic fish tickets are modified. Quality assurance of tickets can be performed with standardized reports to identify problem records that require follow-up evaluation.

The auto-batching tool was developed to assign an additional unique identification year/batch number and individual ticket sequence number to each fish ticket record. Tickets are placed in large envelopes of 50–200 that bear this identification. They are then placed in a box that documents the content and archived. The action of the auto-batching tool is to locate the record within the eLandings database and assign the archival retrieval information.

The salmon auto-batching tool allows the agency staff to gather a lot or batch of tickets that have been briefly reviewed and enter the last six digits of the unique fish ticket number into a table. If tickets numbers are in sequence, like many are when generated on a single tender, a range of ticket numbers can be batched based on the range of six digit numbers in that sequence. Staff then submit the unique identifiers stored in the table to the database for matching.

Because the fish ticket cannot be created until the landing information is saved, and because it is a record of purchase, managers have greater assurance that all commercial landings have been stored in the eLandings repository database. ADF&G staff can also run reports within the Agency Interface application to identify fish ticket records that have yet to be submitted or are delinquent in submission.

Mixed salmon species continue to be reported within the tLandings system, but programmers have developed a tool to allow processors to update these records based upon the production information from their processing facility. Computer Services staff no longer update these records after the fact. This allows much more precision in determining the mixed salmon percentage at the fish ticket level.

Freed from data entry and keying verification tasks, ADF&G staff can focus on a higher level review of landings data. The higher level review of the data has improved the overall quality of the data. Improved data quality impacts many data users and the overall quality of their work.

In the fall of 2008, ADF&G conducted a workshop in Seattle to provide information on web services that were developed to facilitate a data system interface. The workshop was attended by seafood industry staff and third party business/accounting application developers. These web services allow processors to export data from the eLandings Repository database into their proprietary business operations applications. Industry processors normally pull data from the eLandings repository database after reports have been finalized, which normally occurs when grading and pricing information have been added. Daily data extraction is not uncommon. The data are pulled and the price and processing information is documented within their proprietary business applications. This interface completed the goal of one-time data entry. Because of the volume of salmon fish tickets, this feature is especially appreciated by high volume salmon buyers.

IFQ reports

The advent of electronic reporting began with the rationalized crab program for BSAI Crab, which implemented both IFQ and individual processor quota programs. The program is structured to provide real-time quota information to both fishers and processors. It is doubtful that this program could have been administered without the eLandings System. The less complex but equally demanding halibut and sablefish IFQ program also required real-time debiting and the need to accommodate consolidated stacked permits required the robust structure of eLandings to succeed. The IFQ programs for halibut and sablefish also require real time information on quota holdings and harvests.

Any analysis of the costs and benefits of the eLandings System needs to take into consideration the increasingly complex structure of these rationalized fisheries. These allocative programs place new requirements on the skills of both agency and industry staffs. The transition to eLandings reporting required extensive training initially and some formal training events still occur, but to a lesser extent. The partner agencies have developed additional training approaches that have proven successful when staff turnover occurs. A benefit is that IFQ reports for halibut and sablefish require less editing and data verification time with eLandings.

A primary benefit of the eLandings System is consolidated reporting. The processor first reports all harvest in a landing report and then completes the IFQ worksheet to generate the IFQ report. Determination of catch and bycatch, trip effort, and participants in the trip (CFEC permits and IFQ permits) are documented in one landing report. These data are shared with all three fisheries management agencies and are also available to downstream data users

AD&FG Groundfish and IFQ Programs

Interviews with the ADF&G groundfish fish ticket processing staffs in Sitka, Homer and Kodiak were conducted. These three offices process about 85 percent of all fish tickets for the IFQ and groundfish fisheries.

Moving to the eLandings system impacted staff's work in that they are more involved in user reporting support. Reporting, especially for IFQs, has become more complex and often requires staff working with industry to clearly describe the eLandings program. The identification and calculation of bycatch overages for both state and federal fisheries also can require assistance by local ADF&G and NMFS Enforcement staffs to ensure that reporting is done correctly. As a result, staff often take on more of a role in communicating ideas between industry and IERS program coordinators. User support personnel can communicate better ways to operate the programs, program uses, and functions; troubleshoot problems program users need to address; and identify potential improvements to the

system. Staff's day-to-day contact with members of industry give them unique insights into the problems that industry faces when operating the software to comply with state and federal regulations.

Staff from all areas indicated that moving to eLandings/tLandings increased efficiency. Staff from Sitka and Homer reported that a conservative estimate of the time savings was between 45 and 70 percent depending on the area and the types of tickets being processed. One staff member noted that it took them four to five hours to enter a batch of paper tickets. The same number of electronic fish tickets took about two hours to process. Efficiency gains resulted from not needing to enter all the data, clarity of information provided (seeing what is actually on the ticket instead of guessing about someone's handwriting), and the information provided being complete. Having the card swipes from CFEC permits to auto fill header information was described as "a tremendous timesaving". The only fields that are missing occasionally are a partial delivery check box on an electronic fish ticket or the permit holder's signature.

The state does not have direct management responsibility for IFQ fisheries, so its staff's primary concern is a review of reported bycatch. State-managed fisheries still take a similar amount of time to monitor. A formal requirement by NMFS for use by industry focused their resources and solidified compliance. This also allowed the fisheries management agencies to gain more immediate benefits for the implementation of the eLandings System. Currently, well over 95 percent of all landings reports for groundfish, which constitutes approximately 20,000 tickets, are reported within the eLandings System.

Irrespective of the reporting platform, review of groundfish fish tickets is time consuming. Each fish ticket is reviewed individually. If the fishery includes logbook data, that observation is compared to the ticket. A harvest code is also assigned to each fish ticket line item. A line item is a combination of species, delivery condition, disposition, and poundage, such as Pacific halibut, gutted with head on, sold, or Pacific halibut, gutted with head on, retained for personal use. The harvest codes assist managers in the identification of specific harvest with unique characteristics, such as harvest donated for a specific program, spring troll fishery, confiscated catch, state managed species, federally managed species, etc. The assignment of harvest codes was implemented to efficiently extract data. All data collected within the eLandings System, landings, production, and logbook is self-reported information. However, eLandings does have additional data verification rules that prevent some transcription and interpretation errors. Therefore, the reported data are cleaner, but they are still only as accurate as the information reported by the processor.

Missing data have been reduced in eLandings. It was estimated by staff to be a 50 to 90 percent improvement depending on the area. Staff stated that half of the conventional tickets were missing something. The improvement is a direct result of the system not letting an operator submit a landings report unless all required fields have acceptable data entered. In addition, eLandings checks fields like ADF&G vessel number and permit numbers against official lists to make sure a valid code is entered. It is still possible to enter species and area incorrectly, as it is very difficult to build business rules for all errors. Therefore, there is still a need for individual ticket review.

Under the IERS, staff has more timely access to data. As an example, management of lingcod bycatch in IFQ prior to eLandings was far more difficult. Staff would need to wait for fish tickets to be submitted to the local office of ADF&G (up to seven days) and then wait for data entry into the fish ticket database. Now the information is available for summary as soon as the landing has been saved to the eLandings Repository database. The data, even if not finalized, provide valuable guidance for management decisions, especially for a fishery on the verge of closing or a stock of concern.

Agency program coordinators, programmers, and local ADF&G staff have the ability to view landing reports for accuracy immediately upon submission to the database and with an administrative login to

view landing reports that have yet to be submitted. This allows for more dynamic user support, especially if the end user is having difficulty reporting the catch. Staff can respond quickly and address the problem before the fisher departs and can avoid the intervention of NMFS enforcement.

The eLandings Agency Interface application includes a number of queries that have proven to be helpful to all staff, including Alaska Wildlife Troopers and NMFS Enforcement. Developers have also worked to better integrate catch area tracking, when groundfish is bycatch to salmon fisheries.

Prior to the eLandings System, halibut harvest was not entered and available to the ADF&G staff. Being able to track rates of bycatch of specific species is important to managers, especially in Southeast Alaska. Having halibut data available has helped with the management of the DSR fishery. Before staff determines the amount of DSR that is available for a directed fishery in outside waters, it must estimate how much will be taken as bycatch in the upcoming halibut IFQ fishery. That estimate varies based on several factors including the halibut quota. The average DSR bycatch in the halibut fishery is based on a five-year bycatch average. Once the bycatch needs are determined, staff decides whether the fishery will open to directed fishing. Staff members did note that any edits made to the data by IPHC, based on information from port samplers, are not reflected in the data ADF&G staff has access to query. They indicated it would be preferable that those edits could be included in the official halibut database used by all agencies.

IERS has helped develop a cohesive working relationship with IPHC and NMFS and sharing information and ideas is very valuable. Some members of the staff did not have the interaction with IPHC and NMFS that they do now. The sharing of information regarding questions, corrections, and potential IERS improvements has generated more frequent interagency staff discussions. That is considered a “great thing”.

The development of a single reporting portal and the creation of one shared database has provided greater consistency in harvest data for management and policy analysis. While the data are pulled into each agency’s database of record, ADF&G edits or modifies all landing reports within the eLandings System, shared by all agencies.

The relationship between agency staff and industry has changed to being more of an assistance role versus an inquiring or requesting to have data corrected. Staff’s role has transitioned to become more of one to solve problems with the eLandings system for industry. This is especially true for industry staff that do not like using computers. Once the industry users become familiar with the system, they were reported to enjoy working with agency staff to improve the process. However, under both paper fish tickets and eLandings/tLandings, staff feels that the interactions between agency staff and industry have remained respectful. eLandings program coordinators and all agency staffs also realize industry’s workload has changed. While the reporting of groundfish and IFQ species is less redundant, the program reporting requirements and the need to address reporting errors associated with data validation have made the process more complex.

The ADF&G and NMFS developers are very responsive to address issues raised by agency staff. Staff looks forward to some enhancements that will continue to improve the benefits to agency and industry. Some of the challenges that still exist are accurately assigning harvest codes and using data from logbooks to update or verify eLandings. This is a challenge for processors as well, since in some cases they can only report what the fishermen reported to them.

ADF&G Salmon Programs

Well over 200,000 salmon fish tickets are generated and processed by ADF&G annually. The impact of any benefits and costs of electronic reporting will be felt disproportionately from this fishery. The short fishing season, mid-May thru mid-September also disproportionately impacts both agency and

industry. The nature of this fishery can be unforgiving, requiring both robust computer applications and eLandings server, as well as 24/7 user support.

To date, the most extensive implementation of the tLandings application has been in Bristol Bay. During the 2014 Bristol Bay salmon fishery, about 84,000 fish tickets were generated. About 54,000 (60 percent) of those fish tickets were generated using the IERS and the percentage of fish tickets reported through the IERS increases every year. As a result of the IERS, the processing of fish tickets is substantially faster and much less labor intensive for ADF&G staff. Data processing to enter fish tickets into the database was typically taking until the end of February before eLandings/tLandings was implemented. Currently, they are completing the processing of fish tickets in early November. This is a time savings of three months for each of the three employees tasked with verifying and entering Bristol Bay salmon fish tickets. Using the eLandings/tLandings system, staff can start processing fish tickets when they are received. When paper tickets were the norm, staff needed to wait until all paper fish tickets had come from a company for that batch before processing could start.

The improvements in data processing time are achieved with fewer staff members, since at least one position is no longer necessary. In addition to the time savings, staff noted other benefits including:

- Submitted data have already been entered into the computer by the processor;
- Reports are complete and the business rules must be followed before the data can be finalized and submitted to the central repository;
- Information has been validated;
- Calculations are complete and correct—pounds always are summed correctly;²¹
- Information provided is printed clearly and easy to read and there are no translation errors;
- Transcription (keying) errors are reduced since the processors enter the information and it is reviewed by the vessel operator delivering the catch;
- Having the fish tickets entered into the electronic reporting system eliminates problems associated with lost fish tickets. This was noted as a problem in the past if they were misplaced or taken for use in another purpose (enforcement); and
- Agency/processor staff no longer have to constantly look up permit information and vessel numbers during the data entry process and agency staff do not need to spend as much time verifying the information entered.
- Catch reported as mixed salmon is already updated with the correct species composition prior to submission.

Because of the above changes, the accuracy of the fish ticket data submitted to ADF&G appears to have improved. However, staff was unable to quantify the change in number of data errors or missing data fields.

One issue that staff still feels is a challenge is the auto batching process. Staff members noted when they are in “production mode” sometimes the fish ticket numbers all seem the same. They are looking at a lot of consecutive numbers, and as a result, may overlook a fish ticket number that is not really there. When the missing fish ticket number is noticed, staff needs to go back and account for the missing fish ticket. This problem was thought to occur about 5 or 6 times a season in Bristol Bay, but

²¹ It should be noted that there is still the possibility that the data entered could be in error, but the overall improvements in data accuracy were thought to be substantial, yet not quantifiable.

was something staff needed to be aware of and check. While the missing fish ticket number issue was considered a minor inconvenience, the overall process was reported to be much faster.

A benefit to ADF&G staff is when industry users of the eLandings/tLandings program are satisfied that the system works well. Several processor staff members from the Bristol Bay area indicated they like the new program. Processing plant staff felt IERS makes its end of the process better. The fish tickets generated are more accurate and the fact that processors enter the information electronically increases the value of information they input into the system. Processors also relayed to staff that they also spend less time reviewing tickets for problems.

Staff also noted that many tender operators also like the tLandings system. Tender operators that had the most difficulty with the transition were often the older tender operators that had less computer experience. They had the most problems entering the data efficiently and accurately into their laptop. When problems arose, hardware or software, they were less equipped to address them in the field.

The eLandings repository database houses all groundfish and IFQ crab catch and production reports. It currently contains approximately 45 percent of all 2014 salmon landings and a marginal number of invertebrate landings and no herring landings. As the Department implements salmon and other fisheries, the eLandings repository database will increase in value. Groundfish and IFQ crab have the greatest jurisdictional challenges and the completeness of this dataset is of great benefit to all agencies.

The eLandings repository database is useful as it is an agreed-upon record of extraction and fishing activity for all three agencies. Having all the data in one place makes assessing the data much more seamless. Less time is needed to review the data because they are all available, up to date, and accurate. Actual pounds landed are available and are timelier. The queries that are available make accessing the data quicker and easier. Overall, there are better data available to guide policy decisions.

The eLandings system has changed the relationship between the eLandings partner agencies. Authorized agency staff are allowed to access the data, thus less time is spent trying to reconcile data discrepancies. The unified dataset for groundfish and IFQ crab has been beneficial because it is more efficient and data sharing is simplified. Everyone using the same data from the same databases reduces the differences in data that are being reported and used to justify policy decisions.

Stakeholder Group 2: NMFS

Prior to the IERS and the NMFS LRSs (Shorelog and Vlog), WPRs²² and later DCPLs from all shoreside processors, at-sea catcher-processors, and motherships, were submitted in hard copy form, typically via fax. There were three full-time staff members dedicated to receiving, sorting, data entering, and data quality checking these weekly reports. These staff members would typically spend all day Monday through Wednesday at noon entering the data. The deadline for submitting the data by fax was noon on Tuesday and processors would often wait until the deadline to submit the data. Check-in/check-out reports, WPRs, data corrections, and response to public comments were all submitted to the same fax number. Each week there were hundreds of fax submissions (300+) that had to be sorted, alphabetized, date ordered, and checked for completeness. Staff would sort faxes from Monday through Wednesday about noon. During the data checking process, staff often had to call processors to ask questions about the data because they were illegible or there were missing pages.

²² WPR data provided information on products produced by species, gear used to harvest the fish, and areas the fish were harvested at the processor level. Catch information for vessels delivering to motherships or shoreplants is not available from WPRs.

Communication with the at-sea fleet was difficult and NMFS staff could only talk with the vessel's office staff or had to wait until the boat came back to port. This created substantial time delays before data corrections could be completed. The process was frequently problematic, forcing staff to work overtime to meet the deadline for the blend/Catch Accounting System, to run on Thursday to generate an estimate of total catch. Database tables could not be queried until staff had manually entered the faxed reports from shoreside plants and at-sea vessels. Proofing reports were typically generated on Wednesdays and the data would have to be reviewed and checked for quality assurance, and errors in the data often meant that the datasheets would have to be resorted.

The NMFS electronic reporting software (pre-IERS) started in 2000 with AFA shoreside processors (Shorelog) then expanded to other shoreside processors who used it voluntarily. Shorelog enabled electronic submission of crude versions of "fish tickets". This report collected some basic landings information at the harvest vessel level, but did not contain all the IERS data elements. Shorelog eliminated the requirement to submit a paper copy of WPRs and paper shoreside logbooks, and allowed NMFS to collect more data. Vessel production reports were collected via an application (Vlog) developed by NMFS for electronic reporting by the at-sea fleet. Vlog allowed the at-sea fleet to submit WPRs through files attached to an email that could be uploaded into the database versus faxing the production report and key punching the data into the database.

Implementation of the IERS has allowed the agency to collect and access catch, production, and effort data more quickly and have more accurate data. A benefit is that it provides a single reporting site for landing and production data. Agency staff can then access those data immediately, which improves their ability to do their jobs.

NMFS Observer Program

NMFS Observer Program has developed a custom software program (ATLAS) to record data collected by observers that are deployed on vessels and at shoreplants. The ATLAS program works alongside the IERS to improve the quality and timeliness of data that are collected by the North Pacific Observer Program. The parallel development of the two programs provides a case-study of how synergetic relationships between the IERS and other agency data collection efforts can be developed.

Prior to the development of eLandings, the plant observer received a copy of the paper fish ticket at the plant or the vessel observers on catcher-processors and motherships received a copy of the paper logbook on the vessel. The observer staff would then, at the point of observer debriefing, do a visual comparison of the observer report and the industry data. The comparison process was labor and time intensive. Time constraints would allow the observer debriefer to only spot check a few records (maybe the first five records) and, based on that check, make an assumption that the entire report was acceptable. Now that eLandings are available in almost real time, the observer program staff has developed programs to do automated comparisons of the two data sets that are much more thorough and are available while the observer is still on the vessel.

Many data elements that observers collect are also reported by industry in the IERS. The timeliness of the IERS allows observer program staff (including staff that debriefs observers at the end of their deployment) to compare IERS reports and observer data collected through ATLAS, identify errors in reports, and make corrections as necessary. The comparison of the two independent data sets provides a mechanism to help ensure both datasets are accurate. Observer staff felt eLandings was very important and increased the quality assurance/quality control of ATLAS data (and vice versa).

As discussed earlier, prior to the IERS, NMFS Observer Program staff would primarily conduct ad hoc comparisons of the printouts of legacy system reports and observer reports and visually try to identify differences during the debriefing process. Manually conducting the comparisons was less complete and did not provide the level of quality assurance/quality control that was targeted. The combination

of ATLAS and IERS changed the timing of when staff can conduct QA/QC. Data checks can now be completed in close to real-time. This allows the observer program staff to contact vessels or plants immediately to get them to address the problem. This feedback loop increased the accuracy and prevents easily correctable issues from becoming long-term problems. It also provides a mechanism to show industry that people are looking at the data they provide and that NMFS is using the information and is concerned about its quality.

Observer Program staff's access to data has also improved. Observers used to need to obtain a paper fish ticket before they left the plant or vessel. This was critical for completing their reports. Often they would need to wait to get the document. Now, because the data are reported electronically, they can get on another vessel without a paper copy of the fish ticket and observer program staff can access eLandings and provide the fish ticket to the observer. This increases the observer's flexibility in scheduling trips without inconveniencing vessel operators or missing data collection. Also, before eLandings/SeaLandings, the observer program only had access to fish tickets for trips where there was an observer. Now, they have access to all fish tickets. Access to all fish tickets enables the observer program to check that people who should be logging trips are logging trips. Fish tickets also help identify who should be in partial coverage and help predict effort for the upcoming year to estimate observer coverage needs. Access to the complete set of fish tickets continues to be very beneficial to the observer program in meeting its mandates.

From an observer perspective, the IERS is an improvement. Comparing observer reports to eLandings/SeaLandings data prior to debriefings allows the debriefing process to be shorter, so the observers can be released from duty sooner once they are back in Seattle. The IERS has also increased the number of observers that can be debriefed in a day (but no estimate of the number was provided). In addition to shorter, more efficient debriefings, more time can be spent on other issues that are important to the quality of observer data, like the sampling protocol used by the observer. Increasing the number of observers that are debriefed in a day is increasingly important because the number of observers working in the fisheries has dramatically increased as a result of new management programs²³ being implemented. As a result, the number of debriefings conducted has increased. The efficiencies gained from electronic reporting have enabled the Observer Program staff to efficiently handle the increased volume of debriefings.

The in-season group at the observer program has decreased from seven staff members to two. In-season staff's primary focus is on quality assurance/quality control tasks. Staff would review data that come back from being entered into the system to ensure accuracy of the information entered. These tasks now require fewer staff members and less time with the new ATLAS and IERS.

Under the legacy system, many data errors were found after the fisheries closed. Because In-season Management staff relies on observer data for some catch estimates (bycatch and PSC) it made for less efficient in-season management of the fisheries. Now that data are available sooner and data are more accurate, it allows In-season management staff to better determine when a PSC limit is expected to be reached and close the fishery at the appropriate time, if necessary.

The legacy system's structure also made it more difficult to correct errors when they were found. The IERS and ATLAS systems increase staff's ability to make corrections in the official data sets.

The improved electronic data collections systems have eliminated many of mathematical calculations that observers used to do. Fish ticket data that have already been summed can be used by observers. From both a training and data quality perspective, not requiring observers to do a lot of math is an improvement. For example, when vessel observers used to get offload data for BSAI pollock deliveries,

²³ LAPP and CDQ programs typically require full observer coverage and the restructured observer program has added fleets that are subject to observer coverage and increased coverage rates in other fisheries.

the observer would back-apportion salmon using the vessel's estimate for that trip. Now, observer data can be linked to fish ticket and the math is done quickly and accurately in the database.

The IERS has changed the relationship between the observer program and other fishery management agencies. Now observers can provide feedback to OLE if they are seeing issues in season, instead of waiting until the end of the trip or waiting until debriefing. This means that OLE can provide outreach to correct behavior quickly so little problems do not become big problems. Sharing of data has opened up these relationships. Agencies understand the mutual benefit of sharing data when there is little cost to provide access. The sharing of data also encourages agencies to explain how they are using other agencies' data. This dialog fosters better and more appropriate use of the data being collected. For example, when the observer program staff reviewed data collected in the IFQ fisheries for RAM, resulting conversations were described as beneficial to both sides.

The IERS has also impacted the observer program's relationship with the members of industry. As stated earlier, since observer program staff is able to access fish tickets electronically and can provide the information to vessel observers, there will be no delay to the vessels leaving for the next trip. This has reduced tensions between the two parties in some cases.

Industry members also know that observer program data are used for various purposes, and that has increased communication with industry. Feedback from industry describing ways the observer program could be modified to make their lives easier is important. When possible, those suggestions are communicated to the IERS team so changes to the program can be made. For example, the IERS team added an "observer only" PDF feature to the program. The feature allows a processor to generate a copy of the fish ticket with no pricing and grading information that the observer did not require and that the firm considered confidential. Before the feature was added, some processors printed a paper copy of the fish ticket and blacked-out the pricing and grading information. This slowed down getting fish tickets to observers made processors more reluctant to provide them.

Because the IERS and ATLAS programs collect some of the same information, changes in the future could result in reducing the burden on observers to collect information that industry reports. Reducing redundancy is a primary goal of the IERS and could provide efficiency gains for both management agencies and industry.

Stakeholder Group 3: IPHC

The IPHC uses the IERS to collect information on halibut landings and effort. Information is collected through electronic or conventional paper fish tickets received at the local office of ADF&G. All eLandings generated fish tickets documenting sold or retained halibut are reviewed, batched and processed at the local office of ADF&G.

All conventional paper fish tickets reporting halibut and bycatch of other species when fishing halibut are reviewed, edited (as required), batched and entered at the local office of the ADF&G. A copy of each paper fish ticket with halibut landings or halibut bycatch is forwarded to the IPHC. These tickets may be collected over a few weeks, placed in an envelope, and stamped to indicate that they have been processed by ADF&G. Only paper fish tickets reporting halibut must be forwarded to the IPHC. Paper fish ticket data processed by the IPHC are batched, processed, and forwarded to the CFEC for archiving.

All halibut fish tickets and fish tickets with halibut bycatch reported using IERS are reviewed, edited as needed, and batched at the local office of ADF&G. No originals or copies of these tickets will be sent to IPHC, since they can be retrieved from the server and the IPHC is not mandated to maintain paper archives.

Stakeholder Group 4: Office of Law Enforcement/Alaska Wildlife Troopers

The IERS system has changed data availability for enforcement officials. State and federal enforcement staffs both indicated that they use the Agency Desktop Application to access landings data. They typically use the groundfish data during the fishing seasons and when they are working a specific case. For salmon they use the data nearly every day. Under the legacy system they would need to request paper fish tickets from ADF&G. Those requests were time consuming for both enforcement staff and the agency staff fielding the requests. One enforcement staff member noted that when they were preparing for the interview they did a query in about two minutes, and they estimated that the same query would have taken two days under the legacy system. Enforcement staff members noted that at times they felt they were being a burden and tried to minimize the number of requests for data they made. With eLandings they can use the Agency Desktop Application to do their own queries when they have a tip about a vessel or a processor. They can go into the eLandings database and access the reported activity instantly. Now the only time they need to request a paper fish ticket is when they need a copy with a signature.

Enforcement staff members also use eLogbooks more now (although they mostly use VMS for those issues), since those data are also available through the Agency Desktop Application. The same is true with production reports. Having more of the data available allows enforcement staff to access the best data for a specific purpose in a timely manner.

The Agency Desktop application provides extract queries that are used by enforcement staff for standard data queries that save time and reduce the need for higher level programming knowledge. For example, when they are going to a specific location, they can simply pull the information for the appropriate period of time to determine a firm or group of firms' activity. Staff can also use the queries to determine the level of processing/fishing activity and plan for patrol staffing to specific areas based on landings reports.

Because enforcement staff members have greater access, they spend more time accessing/analyzing data. The convenience of accessing the data has been beneficial when working with different stakeholders. For example, they can now catch an error like king crab being misreported as a discard instead of deadloss and work with the stakeholder to ensure it is reported correctly. Timely data help to keep little problems from becoming big problems. Staff noted that it is better for everyone to catch a problem sooner, so that the same issue will not continue for an entire year.

Enforcement staff also noted that with eLandings it is very unlikely for someone to be able to complete a fish ticket but not have the correct permits, log books, or observer coverage. All the checks built into the system and the agencies working together improve the system help prevent those types of errors. Catching specific activities early helps to reduce the impact of the violation on both the fishermen and the resource.

Under the legacy system it was more difficult to catch those types of misreporting errors in close to real time. IERS has sped up the access enforcement staff has to data. Under the legacy system, fish tickets were being mailed to the agency and data processing within the regions was slower. It could be frustrating for enforcement staff as fish ticket availability was slow. It was just more difficult to determine what was happening on the fishing grounds in close to real time unless staff went down to the docks. Now everything is on eLandings for groundfish and staff knows immediately what is happening on the fishing grounds. A person can be in one port and know what is happening in any other port in the state. They can basically conduct a virtual tour of any dock. Before, they would need to wait to for vessels to come to port and for the fish tickets to be processed. It was too slow from an enforcement perspective.

The eLandings system has changed the relationship between enforcement agencies and the eLandings partner agencies with which they interact. For example, ADF&G used to collect paper fish tickets with discrepancies until they had a sufficient amount to send; now they will just call and give a landing report number. This provides enforcement staff a better opportunity to stay current with problems.

Access to the Agency Desktop Application has streamlined a lot of work needed for interagency cooperation and meetings. Before that application was available, the information could not be accessed without making additional requests.

The relationship with the industry staff submitting reports has changed. Enforcement staff now begins working with processors at the beginning of the year or fishing season. Because all the information is easy to access for everyone, it is a lot easier to work with processors. The documentation through eLandings has improved so processors are less likely to miscode delivery and disposition codes. If processors do submit data using an incorrect code, they can more easily correct the mistake in the IERS.

Stakeholder Group 5: Alaska Commercial Fisheries Entry Commission

The CFEC is an organization tasked with helping to conserve and maintain the economic health of Alaska's commercial fisheries. Its activities include licensing of vessels and vessel operators, and assisting in the administration of limited entry fisheries. The CFEC Annual Report²⁴ states that the CFEC's mission is to promote the conservation and sustained yield management of Alaska's fishery resources, and to promote the economic health and stability of the fishing industry. The CFEC works with other state and federal management agencies to develop, analyze, and coordinate fisheries policies.

Its primary functions are limiting fisheries, licensing fishermen and vessels, adjudicating claims, performing critical research, and providing data to governmental agencies, private organizations and the general public.

The CFEC has not realized any cost increases with the implementation of the IERS (eLandings); rather, costs have been reduced as a result of spending less staff time working with halibut and COAR data. Estimates of the cost savings were not available.

Data quality seems to have improved, but CFEC does not have a way to cross compare to other data sets. Staff members did note that when working on a report, they cross checked catch from Chignik and South Alaska Peninsula going back to the 1970s. During the early years they found enormous differences between CFEC numbers and ADF&G reports. More recent data are much more likely to be very close when the two sources are compared.

The number of ADF&G vessel ID corrections has decreased substantially as a result of the IERS. A research analyst recently checked ADF&G numbers in some fisheries and did not find any obvious errors. The improvement was attributed to the data verification within eLandings. Developing the IPHC data is a lot less work now. Prior to eLandings it was very onerous, took a lot of staff time, and often had to be modified. Analysts are now able to provide better data more quickly.

The COAR data quality has improved and matches better with fish tickets. Ten years ago those matches were not nearly as clean and required additional time to generate a useable data. The CFEC goes through a rigorous pricing process and is one of the agencies that are most likely to identify errors in prices

²⁴ http://www.cfec.state.ak.us/annrpts/2013-2014_AR.pdf

CFEC staff noted that during the recent Chinook salmon mitigation process, very few people reported differences in CFEC data compared to their fish ticket data. Staff gave individuals their fish ticket landings and very few people contested the results. This is a substantial improvement over pre-IERS data release of fish tickets for those types of management actions.

The data access for CFEC has greatly improved. Ten years ago CFEC would not get fish ticket files from ADF&G until the end the March and it took a couple of years to get the halibut data associated with the ADF&G fish ticket records. The fish ticket landings records now include the halibut data with other harvested species. This gives the CFEC more time to complete its pricing process and its economic reporting, basic information table and quartiles are easier to generate and are timelier. This benefits many members of the public including fisherman that rely on that information. The reduced data development time also means the reports become available to the legislature in session, which is important now that its “season” is shorter.

eLandings has had the most positive impact on how CFEC can address halibut data. It took a substantial amount of work to access the IPHC data and restructure them to conform to the ADF&G data formats. CFEC’s relationship with IPHC has improved as halibut data are now fully available as part of other harvested species documented on the fish ticket, allowing immediate access. CFEC and IPHC also work together to correct data inconsistencies CFEC finds.

CFEC also has a closer working relationship with AKFIN because of its use of the gross earnings file. Gross earnings data are very time critical to AKFIN and improvements under IERS allow them to complete the U.S. Fisheries report on time. The close working relationship has also streamlined dialogue with AKFIN. The only needed communication now is when the data will be ready. In the past, the dialog was more frequent and detailed regarding errors, data elements, etc.

Finally, CFEC noted two additional data improvements—fewer fields were missing in the data and the incorporation of additional data fields (disposition and management program) improved documentation. CFEC’s work with pricing landings and its use of COAR data will benefit from work that is currently being put in place to integrate COAR and eLandings. CFEC staff also noted that having all the codes and data information posted on the eLandings WIKI is “wonderful”.

Stakeholder Group 6: Alaska Fisheries Information Network (AKFIN)

When considering the benefits of eLandings to AKFIN and data users that receive data from AKFIN, it is important to separate the benefits that AKFIN provides regardless of whether the Legacy or eLandings program is in place. This section will focus on the benefits of the eLandings program to AKFIN as opposed to the other benefits AKFIN generates as a data provider and its construction of a comprehensive data base.

One of the primary benefits of the eLandings system is the collaborative working environment that the project has fostered. AKFIN staff noted that all agencies associated with the eLandings program seem to have strengthened their working relationships with NMFS, CFEC, ADF&G, NPFMC, and IPHC as a result of having clearly defined roles that have been established through the development and implementation of eLandings.

Currently AKFIN has staff located at the NPFMC office and the Alaska Fisheries Science Center, and three positions at the PSMFC headquarters office (including the program manager). The AKFIN staff embedded within these agencies provides direct support in addition to working on other tasks as assigned. Relationships are improved because eLandings has allowed AKFIN staff to spend more time meeting each agency’s data needs, usually on tight timelines, rather than spending more time checking and formatting data before the requests can be completed.

AKFIN staff noted that consistently having access to data in standardized formats has reduced the programming time needed to update the comprehensive data base. Standardizing the feeds into the comprehensive data base has allowed AKFIN to develop some generic programs that can output recurring general data requests. Those programs can also be tweaked to address non-standard requests. The ability to address specific agency requests using programs that have been written in the past has reduced the overall time spent programming and has freed up time for AKFIN to work on other specialized projects as they arise or improve the quality and scope of the comprehensive database they have developed.

Improvements in data quality were identified as a benefit of the eLandings program. Under the Legacy data reporting system, AKFIN staff would spend several days checking the accuracy of ADF&G numbers that were reported. When erroneous numbers were identified, AKFIN would change the data and notify the appropriate agency of the issue. In 2014, fewer than 10 changes to the ADF&G data were necessary. The corresponding time spent correcting those data dropped to well less than one day. Other data fields also required correcting in the past and the time spent correcting many of those fields has also been reduced to a negligible amount.

A primary reason why the number of reporting errors has decreased is the business rules implemented in the eLandings System. The business rules require that much of the information entered and submitted in the eLandings System is validated against database tables of valid data. If the information submitted passes validation, the program will message back to the person entering the data that the report was successfully saved. If an element of the information entered and submitted fails validation, the eLandings System will message back the specific problem. The person submitting the data will then be asked to correct the data using a reference sheet and resubmit the data using a valid identifier. The types of data that undergo a review using business rules are ADF&G numbers, federal permit numbers, statistical areas where harvest occurred, port of delivery codes, gear codes, species codes, etc.

One data field that still requires time to edit and correct is the processor identification number. This number is generated by the Alaska Department of Revenue for tax submission purposes. Intent to Operate processor identification numbers issued by that agency are created to define entities subject to state taxes. When the entity changes for taxation purposes, a new code may be issued or it may use a code it was issued in the past. Tracking the various codes associated with a specific processing plant remains a challenge under eLandings, in some cases.

Documentation of the data collected by NMFS, ADF&G, and the IPHC has improved under the eLandings program. The partner agencies have set up an Agency Desktop Documentation website that contains metadata. The information includes the User's Manual and information needed to enter/process data for groundfish, crab, salmon, COAR, and all agency codes.

Stakeholder Group 7: North Pacific Fishery Management Council

The NPFMC (also referred to as the "Council") is one of eight regional councils established by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) in 1976 to manage fisheries in the 200-mile EEZ. The Council primarily manages groundfish in the Gulf of Alaska, Bering Sea, and Aleutian Islands, targeting cod, pollock, flatfish, mackerel, sablefish, and rockfish species.

The Council also makes allocation decisions for halibut, in concert with the International Pacific Halibut Commission. Other large Alaska fisheries, crab and scallops, are managed jointly with the State of Alaska.

The Council depends on data collected through the IERS to prepare and amend fishery management plans and regulations for the fisheries occurring in federal waters (3–200 nm from shore). The Council

is tasked with making management decisions based upon the best scientific information available (National Standard 2 in the MSA). It is also tasked with managing individual stocks as a unit throughout their range, to the extent practicable; interrelated stocks shall be managed as a unit or in close coordination (National Standard 3 in the MSA). Development of IERS has been critical to helping the Council better achieve these mandates.

The NPFMC's use of the IERS and the placement of an AKFIN staff member at the Council's office to generate most data queries used in analyses makes it difficult to disentangle the benefits of the IERS and those generated by AKFIN. Staff members commented on the substantial time savings now that AKFIN staff is using IERS data. One person noted that before the IERS and AKFIN, they could spend as much as 75 percent of their time getting data ready for an analysis. Now they only need to determine the data that are needed and make the request for those queries.

The data that are provided are cleaner and require less verification than in the past. The NPFMC staff has historically needed to combine fish ticket data²⁵ and weekly production report data to estimate the total catch at the harvest vessel level. These estimates were often different from the official data source at the time (Blend Data). As a result, data were often questioned and closely scrutinized by stakeholders when analyses were released to the public. Even providing information as simple as vessel or processor counts in a fishery was often questioned. ADF&G number errors (often transposed numbers) would increase vessel counts beyond the number of actual participants. Errors in processor codes and processors using multiple Intent to Operate codes in a year also often resulted in overestimates of the number of processors. The IERS requires that valid ADF&G numbers are entered into the eLandings/SeaLandings system. This has greatly reduced inaccuracies in vessel counts that are active in a fishery. The linking of multiple Intent to Operate codes to the same entity has reduced errors in estimating the number of processors active in a fishery. In general, over the past few years, the quality of data presented in analyses seems to be questioned less. This is due to all agencies having the same data and AKFIN developing standardized methods of extracting the data for specific purposes. Reduced conflict over the baseline data has reduced the stress on staff. It has helped to streamline the process for developing analyses, especially in the baseline data sections.

Additional data fields used by staff in analyses are also available. These data allow staff to address questions that would have taken special requests to the agency with the raw data or that they simply would not have been able to answer.

The availability of all the data codes and definitions has also been very valuable. It was easier in the past to misuse data or push them beyond their intended limit because data fields were not well defined or described in the documentation available. The IERS has greatly increased the metadata and their availability to all data users.

The NPFMC noted that it has more timely access to data, but still relies on fish ticket data generated by CFEC, as it includes value information. Therefore, for most analyses, it must wait for the annual CFEC data feed and does not use the real time data from the Central Data Server.

Stakeholder Group 8: At-Sea Harvesters

Catcher/processors use SeaLandings. SeaLandings is required to use eLogbooks. Some catcher-processor captains extract eLogbook data as a reference for information on good trips and fishing locations. A benefit of eLogbook is that a captain does not need to search through old copies of paper logbooks to find specific information. eLogbooks allow the captain to search stored files on the ship's

²⁵ Fish ticket data were further classified as ADF&G fish tickets and CFEC fish tickets (fewer fields but price data were added), because after editing and manipulation, the data were different.

computer to efficiently find historic fishing information. Even if relief skippers erase all the information off the ship's navigation computer, the captain can still find the information by searching the eLogbooks that must be retained.

The pre-eLandings reporting process required the vessel operator to create paper copies of weekly production reports, scan them into the computer, and email them to NMFS. There were no flow scales then. Production data and product recovery weights were used to estimate round weight. Those production and weight estimates were entered into the logbook. Discarded fish are still entered the same way (from observer information) under the SeaLandings system.

The post-eLandings reporting process generates daily reports that are easier and simpler to produce than before. The new SeaLandings system was described as being more accurate due to the checks within the system versus before when there was no check on the data. Reports were also described, by some, as easier to complete. The learning curve took time, but agency staff was very helpful. Once the vessel's crew learned the SeaLandings program, people liked it. Correcting errors is reported by some captains as being easier in SeaLandings. Under the paper system the mate would make a line through a number (no scribbling out) to show that an error had been made and corrected. Under SeaLandings they just need to make the change on the computer and numbers (and other information entered) are always legible.

Integrating the flow scale into the catch-accounting process has also improved the data accuracy. However, the private company used to monitor their cooperative's catch uses different numbers than those recorded on the vessel. Cooperative catch monitoring includes fish counted by the observer. These are fish that fall off the line or are shaken off the line before coming onboard, and pre-bled fish. Cooperative catch estimates use those numbers because that is the method agreed to by members of the cooperative to determine the official catch of each vessel for cooperative accounting.

One captain indicated that he preferred using SeaLandings over eLandings, because SeaLandings is a local program loaded on the ship's computer and eLandings requires an internet connection to the central server. Poor internet service at sea often disrupts his ability to use eLandings. For example, when the vessel is moving in certain directions, the internet does not work well. In SeaLandings the captain only needs to finish the report on the local computer and send the file that is output whenever he has a strong satellite signal.

One vessel operator indicated that he has "more faith in the data now". He felt it is was cleaner and more accurate since the program notifies the person entering the data when they make errors. The new system also ensures that data are not lost. One person noted that if a paper logbook was damaged, the information was lost. Using the new system that is not an issue.

Another benefit of the program is that there is a personal relationship with NMFS staff members now. These personal interactions between agency and industry were thought to make the agency more human to industry and vice versa, allowing a better dialog when problems or suggested changes to the program were identified.

The frequent turnaround of information is beneficial to the home office and the data are more accurate. Also, when the vessel operator is required to report the information on a daily basis instead of a weekly basis it helps generate more accurate data. It is also easier to identify and find missing data now because the home office can see all the pieces of data being entered. The more consistent flow of data is also helpful addressing problems with the data early. If a new skipper does not understand SeaLandings, office staff can find out fairly quickly instead of later in the season/at the end of the season when they would need to fix a lot errors. Under the legacy system office staff had less access to the data in real time and was less likely to edit weekly reports. That task was left to the fishermen.

Stakeholder Group 9: Shoreside Processors

Processors and the first buyers of fish are required to report landings information to the three partner agencies through the legacy reporting process or IERS. Because they are the designated reporter, they have the primary responsibility of understanding and utilizing the system to comply with reporting regulations. Before the IERS was implemented, processors submitted paper fish tickets. The deliverer's permit card was imprinted on the ticket and information on the delivery vessel, species, gear, area, and weights handwritten on the four-part paper form. Price information was frequently omitted. After ensuring the ticket was complete, the permit holder and processor staff person signed the fish ticket. Tickets were then separated into batches based on date caught, gear, district, tender, and fishing period, and sorted into chronological order. The total weights (and number of fish/animals for salmon or shellfish) per batch of tickets were added up on a batch tally sheet. Tally sheet information and the corresponding batch of fish tickets were entered into an internal company data program and then fish tickets were distributed (white copy to accounting, yellow copy to ADF&G, and golden copy to the harvester). If the landing included stacked permits from a single fishing trip, this process might be repeated multiple times.

When landings occurred to a tender, the reporting was identical. The tender vessel identifiers were the only additional information added to each fish ticket. At the end of the tender trip, tender vessels brought brailer tally sheets and fish tickets to the plant and offloaded the entire load. The tender operator also completed a tender trip report, detailing each delivery. This handwritten report frequently took up to two hours to complete. Once received by the office, staff entered all of the tally sheet and fish ticket information into their accounting system.

With the implementation of eLandings, in a typical operation, the processor logs onto the eLandings system and selects the type of report to be completed—groundfish, salmon, salmon troll, crab or a production report. Information including the harvest vessel, permit number, and fishing location is entered first. The processor uses a magstripe reader to capture one or more CFEC permits (if stacked) and completes the Stat Area worksheet if the harvest was proportional to all areas. Next, the processor enters the catch by species, delivery condition, and disposition categories; provides grading and/or sizing data; and notes whether ice/slime are present (if appropriate). The system then calculates the initial ex-vessel payments based on prices previously entered into the system by the processor. Finally the processor uploads the final fish-ticket report to the ADF&G server, prints multiple copies (no fewer than three) of fish tickets, and has the harvester sign the fish tickets, giving a copy to the harvester. During the submission to the eLandings database, most data values are validated using established tables and programmed business rules.

If harvesting occurred in an IFQ fishery, then additional data are entered regarding the IFQ permits and the allocation across permits, if multiple IFQ holders are part of the landings. Also, additional IFQ-specific reports are generated.

The tLandings system on tender vessels works much the same way, except that each fishery opening and location has its own thumb drive where the electronic version of the information is stored. When the tender reaches a plant, each thumb drive is uploaded and the aggregated totals from the eTickets are compared with the total delivery. When catch is separated by species at the plant, this information is updated on the tickets and uploaded to the ADF&G server.

Processor Costs and Benefits

The benefits processors, fish buyers, and tender operators derive from the IERS vary widely by firm. In general, businesses want a system that is efficient in terms of staff time and company resources and that provides useful information to all levels of the firm. Most processor staff that were interviewed

feel that the IERS has been very beneficial. Others were somewhat neutral and a small group would prefer to return to the legacy system. However, all processors understand the need for agencies to collect accurate and timely landings data to properly manage the natural resources under the ever-changing management structures used to regulate the fisheries.

Moving to the IERS has changed companies' attitudes and approaches to recordkeeping and reporting. Many of the companies indicated that it is a much smoother process. One at-sea company noted that when a new skipper did not understand the eLogbook process, the office was able to determine that quickly and fix the problem. With paper logbooks, the issues would not have been discovered until later in the season and would have required a lot more time to address the problem.

Processors spend less time editing data for their own internal use and less time editing data as a result of requests by ADF&G and NMFS. This reduction in time spent editing data is a result of the business rules built into the IERS.

Firms understand that the data they enter in the various forms will be used for specific purposes within the plant and by management agencies. The knowledge of how the data will be used creates incentives to ensure the data are accurate. Another firm indicated that under the legacy system, WPRs were reported to NMFS when the counts were "close" to the offload summary. Now the Product Transfer Reports used by the firm are consistently close to the WPRs and are based on what the skipper puts on their scale reports and offload weights.

The data provided to the agencies are also easier to read, so there are fewer errors that occur as a result of ADF&G staff needing to interpret handwritten fish ticket forms. Because the data are entered correctly, less time is spent by agency staff contacting the plants that submitted the data, and the plant's staff spends less time addressing agency requests for clarification or corrections. One firm estimated they spend less than half the time making corrections under the IERS compared to the legacy system.

The IERS creates a system with less redundant data reporting. Linking the front-end reporting for logbooks, fish tickets, and production reports has saved time. It also helps to ensure that all data reports have consistent information. One individual noted that the company's upper management was always very concerned about numbers matching in the various reports sent to management agencies. This was often a challenge because the data were derived from different sources with different reporting requirements. With the IERS, upper management was reported to have complete confidence in the numbers that are going through the system and being reported to the agencies.

One processor that has completed its 2014 COAR report using the IERS indicated that collecting, analyzing, and reporting that information took about two weeks under the legacy system. Under the IERS it took one day. The processor did note that it was somewhat intimidating to begin with, but it was easier than it appeared. Using the IERS also helped the processor to better understand the COAR reporting requirements and made it easier to provide the information that was being requested. The COAR will be more widely available for use in 2015, so limited information is available for the processors that were interviewed.

Discussions with processors indicate that they almost universally accepted that the landings data are more accurate, in terms of data entry errors. Built in data entry rules, the use of magstripe readers for CFEC permit information, and auto-fill features for some fields decrease the chance for data entry errors. These improvements have been reported by the data users as well.

Embedded eLandings tools automate functions that used to be performed by hand. Tools embedded in the IERS programs not only reduce the number of data entry errors, but they also reduce the time spent calculating and entering the data. Before the IERS, processing staff needed to do a lot more

checking and cross-checking of the data, especially with stacked permit reporting. Now that all the systems are linked, the amount of double checking time is reduced.

Using the IERS allows the processors to check math on their scale sheet summaries and other in-plant calculations. These tallies need to be summed and math mistakes can and do occur. Because the eLandings automatically sums the weights of all species by area, product forms, and delivery codes, it provides a check for other calculations that are completed in the plant. Before, if the two totals did not match, they both needed to be investigated. Now the staff can assume that the math is correct in the eLandings calculations and they can quickly and easily check the other calculations that were performed by hand to find the error. The tLandings/eLandings system also automates the process used to estimate salmon volumes by species when mixed-species deliveries are made.

The addition of data extract tools has been very beneficial to processors. eLandings was not initially set up as a reporting tool. The addition of reporting components now provides a much more efficient way to summarize landing information. The assignment of management areas has also greatly improved their ability to simply extract the relevant data for their specific query. The extract tools within the IERS are used by some companies to access the data for internal use and not by others. One company noted they use the extract tool for crab landings data but not for pollock and Pacific cod. For pollock and Pacific cod landings, they use their own system so they can access their own unique identification key. When they switched to eLandings it did not generate the identification numbers they wanted so they continued to use their system to generate the identification numbers and upload the information into eLandings. For crab landings they are able to use eLandings to enter the reports and extract data as needed for the IFQ monitoring that is needed. Other companies noted that they use eLandings for all their data entry and extracts. Companies that can utilize the IERS to enter data for their own company's use appear to find the IERS more efficient than firms whose internal accounting systems are less compatible with the IERS and that need to enter data into both systems. It is anticipated that as the IERS matures and is altered less frequently, more firms will be able to utilize the data and extract features in their internal accounting systems.

Benefits are also gained from being able to generate other reports that are required by firms, but are not directly related to the IERS. For example, one firm indicated that the IERS has been a substantial help with preparing required Environmental Protection Agency reports and preparing for determining buyback payments the firm is required to submit.

Instant access to the landings, production, and logbook data by plant staff and staff at the firm's headquarters is a benefit. There are a multitude of uses that real time information provides to staff not located at the processing facility. This access allows problems to be addressed sooner (as discussed earlier), real time delivery patterns to be tracked, and product inventory to be instantly accessed. One smaller firm indicated that sales staff could access data from the remote plant if it needed to see how much of a specific product was available for clients. Another person indicated they could track the vessels that were delivering and the throughput of a specific plant. The IERS also allows staff within the plant to see what is being reported on all the fish tickets. Having all the information available on the computer eliminates the possibility that paper fish tickets will get misplaced or lost. Searching for lost fish tickets could be time consuming for everyone, including plant staff.

As discussed in the costs section, there are cost savings for some firms, but not others. Companies that are efficient at capitalizing on the IERS benefit from the infrastructure developed by ADF&G and NMFS. Firms that have fewer resources seem to have more difficulty adapting quickly to potential benefits.

Finally, many persons interviewed commented that they now have a better, more personal relationship with NMFS and ADF&G staff. Because of the IERS, the agency staff and plant staff work closely together to provide training and address specific questions regarding proper use of the system.

It was noted that the agencies have a symposium every summer where fishermen meet with staff running the SeaLandings/eLandings system to work out the bugs. As a result of those meetings, one person noted that there are not a lot of hurdles left to making the system user friendly. Only one person commented that they felt agency staff sometimes seemed frustrated by all the industry inquiries. Every other person contacted seemed to feel the agency staff were courteous, responsive,²⁶ and helpful. Knowing who to contact for help to address a specific issue and having worked with that person before was considered to substantial benefit.

Stakeholder Group 10: Tender Vessels

Additional benefits of the tLandings system are presented in the processor's section. The information presented in this section is specific to benefits that occur at sea.

Persons interviewed indicated that most tender operators liked the tLandings system. The system was viewed as being more efficient when vessels deliver to the tender and fish tickets can be processed more quickly at the plant. Information recorded on fish tickets at the tender was more legible and did not need to be deciphered when transferred to the plant.

The business rules included in tLandings were considered helpful by everyone, since data entered incorrectly at the tender are hard to correct at the plant. This is especially true for information difficult to obtain once the harvest vessel leaves the tender. The thumb drives supplied by the processor can be loaded with the processor's information for species, condition, grading, and pricing. tLandings also provides a picklist of catcher vessels with a history of deliveries with the processor, thus expediting valid documentation. Selecting a vessel from the provided list automatically loads the vessel information into the fish ticket.

Instead of using an imprinter to collect the permit data from the person making the delivery, the information is now collected from a magstripe card and input into the tLandings system. This saves time and reduces the number of errors that can be introduced by having imprints that are difficult to read or are that have numbers transposed when key-punched into the system.

Stakeholder Group 11: Contractors with Industry

The IERS provides the ability for cooperative managers to quickly and effectively access data from all cooperative members to determine the amount of quota harvested and remaining. It also allows the cooperative manager to determine whether members are abiding by the harvesting terms and conditions of their cooperative contract.

Industry contractors are a class of persons that can review the data and identify errors. For example, catch histories are closely checked when allocations are made. In addition, cooperative harvests are closely reviewed to ensure deductions from the cooperative allocation correspond with reported data. The estimates of catch include both PSC, groundfish discard, and retained groundfish.

Costs for other stakeholders (primarily data users) were not collected. It was assumed that they had very little change in overall costs associated with moving to using data from IERS. However, persons interviewed were able to comment on costs relative to their operation if they wished.

One data user did note that they realized decreased costs in downloading the data. Each time they wanted to download data they would need to log into the agency server and run a download program. The agency servers could be slow to download the data and the process could take well

²⁶ There are requests for changes or additions to the IERS that have not been implemented, but even in those cases there has been an ongoing dialog between the stakeholders.

over 30 minutes for each operation. This process would need to be completed for each data source. Under the IERS, they have been able to automate the data download process to run at night. Therefore, they no longer have to log into each server and access individual data sources. It also is less critical how fast the agency servers can download the data because the system has been automated to download at night and have the data in the system when staff arrives for work in the morning. While this process saves time downloading the data, at least 30 percent relative to the old system, it does require more programming time to implement and update. The stakeholder did not know whether any net cost savings were realized, but noted that the overall system was more efficient and reduced non-quantifiable costs associated with downloading errors. These errors include downloading a file that was not the most recent version, which could overwrite any corrections that had been previously made to the data.

Before the current IERS, NMFS gave processors a computer-based program (Shorelog and Vlog) to enter data. The programs generated files that the processors were required to email to NMFS. The processors would also send a copy to private companies hired by industry to monitor catch. Those files were used by industry contractors to build a landings data set for the vessels targeting Pacific cod and pollock. These data enabled the contracting company to provide the fleet information that helped firms and their captains to manage Pacific cod and pollock fleets. These data were not used for complex management issues like GOA sideboards. The system was cumbersome and took a lot of everyone's time to coordinate and synchronize. If a file was missed or downloaded in the incorrect sequence, it caused a lot of problems with data accuracy. Files updated in the wrong order (older files last) would overwrite data that had been corrected with the old, uncorrected data. Tracking and automating all the data downloads and corrections are important to having the best data for clients.

Official salmon bycatch data come to the contractors through the observer program office. With the IERS they can get the salmon bycatch data quicker through fish tickets now that eLandings is in place. Having access to those data provides a preview of bycatch estimates before they can access the official estimates. They also believed it was good to have two sources of data to compare.

The current eLandings program, where each processor interacts with the main database through a web browser, is vastly better in the opinion of one contractor interviewed. The programmers were thought to have done "a good job of putting together a security model" that made it reasonable for contractors with a signed waiver to access data a processor let them access. Contractors are not granted complete access. They are basically given the same access as the processor's employees. The information they access does not contain all the confidential data. Under the old system the files had all the firm's data and the contractor did not want or need information on transactions to complete their tasks. Under the IERS they can select just the data needed to complete their tasks. They do not download extra data that overburdens their system and requires additional effort to ensure it is not accessed by persons without authority to see the data. The additional data under the old system also increased costs associated with processing and filtering data.

Under the IERS system NMFS has put together web services that allow the companies with access to narrow the queries to just the boats they manage. The current servers were described as slow, but the overall process as very efficient (it takes a long time to download). To accommodate the slow server, the contractor automated the download process to run at night.

Data that are currently being downloaded from the central server include information on shoreside AFA catcher vessels and production data for all catcher-processors. eLogbook data for catcher-processors will be added to the download soon because of the experimental fishing permit that was issued to analyze deck sorting of halibut on trawl vessels to reduce mortality. The contractors can also access crab landings for the CDQ corporations. The IERS makes all these tasks easier.

The IERS and automated access to data also allow companies to better integrate data their clients want that is outside the IERS. For example, downloading observer data and West Coast fisheries data and linking it to IERS data is easier and allows them to create a more global view of the information associated with their clients. As a result of working with data from different fishery management regions, these data users support the development of a nationwide, or at a minimum, a West Coast database of fishing, effort, and observer data.

eLandings did not change the working relationship with NMFS and the state, because they felt they have always had a very good working relationship. These long-term strong relationships with third-party data users were thought to help development of eLandings and improvements to the system after it was implemented. An example given was that the security measures needed to be built into the system for people pushing data into the system (processors) and third-party data users pulling data from the system were already strong and well established before the IERS.

One of the major time savings realized by these users was the downloading of data. Before the IERS it would take a long time to log into each system and download the data. When they began working with limited access privilege programs and cooperatives, it was just too much information to download and keep up with manually. Now that is all automated, the new system saves approximately 30 percent of the time it took to download and update files. However, there are tradeoffs—some or all of the saved time now needs to be used to maintain the programs/systems that are used to download the data. The contractors have never gone back to determine if there have been any real money savings from moving to the new system.

The primary benefits of the IERS is that all the data processes can be completed faster and can happen 24/7, as opposed to when staff are at the office to log into the servers and download information. They are also less likely to make mistakes using the automated system to download files. This was always a concern under the old system (e.g., forgetting to specify the correct date range for that download).

The greatest benefits are not cost/time saved working with the data, but the productivity in using the data. With the IERS in place, contractors are able to set up automated alarms that sound and are sent out to the fleet when they need to be aware of a bycatch event. Those warnings are tied to VMS data which can generate links to track lines that are tied to Google Maps, allowing clients to click on a link and go to a web site and view exactly where the bycatch event occurred in almost real time. These real-time warnings could not be done without automating the system, thus helping to reduce the catch of prohibited species.²⁷ Under the old system the contractor would know when there was a bycatch problem. However, to notify the fleet they would need to make sure VMS data were downloaded (which is now done automatically too), then plot the tow with GIS, make a copy in an MS Word document and send the document out to all the clients. That process could easily take 20 minutes to 30 minutes to prepare and send out for a single alarm. If they had 20 alarms a day to process, that could take 10 hours of staff time, and if the event occurred at night, the clients may not be notified until the next morning. As a result of the current data systems, dealing with that many events any time of the day it is not a problem. The program auto-generates and emails the warnings as needed. The IERS system and skilled private contractors working together provide valuable and timely information to the fleet. This would not be currently available without the two well-designed systems working together.

²⁷ Prohibited species in the North Pacific groundfish fisheries are salmon (Chinook and chum) and halibut.