

FY 2007 - 2008
OPERATIONAL PLAN

FISH DISTRIBUTION DATABASE PROJECT

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TABLE OF CONTENTS

LIST OF TABLES	iii
LIST OF FIGURES	iii
INTRODUCTION	1
PAST GOALS	3
Atlas and Catalog Revision and Production	4
GIS Database Revision and Production	6
Conversion of the paper Atlas data to digital data	6
Internet Based Services design and implementation	7
Upgrades to existing AWC auxiliary databases and user functions	7
PRESENT OBJECTIVES.....	7
Atlas and Catalog Revision and Production	8
Update and Maintain the FDD	8
Documentation of Existing FDD entries.....	9
Internet Based Services.....	15
Cooperative Programs.....	15
National Hydrography Dataset Revisions.....	16
REPORTING AND PERSONNEL	17
LITERATURE CITED.....	18
APPENDIX A. NOMINATION SUBMISSION INSTRUCTIONS.....	19

LIST OF TABLES

Table 1. FDD/AWC Revision and Production Timeline 2007 - 2008.....	4
Table 2. Numbers of total and undocumented FDD water bodies by region	9
Table 3. Statewide Stock Assessment Survey Activity by ADF&G Office.	10

LIST OF FIGURES

Figure 1. FDD Nomination Process.....	5
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INTRODUCTION

Since shortly after statehood the Alaska Department of Fish and Game (ADF&G) had been responsible for specifying the various rivers, lakes, and streams or parts of them that are important for the spawning, rearing, or migration of anadromous fish. Between 1959 and 1962, as with the territorial law from which AS 16.05.870 was derived, there had been no requirement for specification of anadromous fish bearing streams; all waters of the state were protected. In 1962 State legislation was enacted which required that anadromous fish bearing streams be specifically identified. The first list of anadromous fish bearing streams appeared in 1963 in Title 5 of the Fish and Game Code and named specific streams on Bristol Bay between Cape Menshikof and Cape Newenham by watershed. Those streams not specifically mentioned by name were covered under a blanket statement which read in part – Rivers, lakes, or streams within 50 miles of the coastline, including offshore islands, from Dixon Entrance, Southeast Alaska, to False Pass at the end of the Alaska Peninsula to Cape Menshikof on Bristol Bay. Also under Title 5, anadromous fish were identified as any of the salmon, cutthroat trout, rainbow-steelhead trout, Arctic char, Dolly Varden or sheefish which migrate to or from saltwater during their life cycle.

Because of the sheer number of streams that were being identified, a separate listing or “Catalog” was first developed in 1968. This listing as well as the 1975 Catalog appeared to essentially be a list of streams identified by area offices. These and subsequent editions of the Catalog were adopted by reference under Administrative Regulations. As a result of 1980 legislative changes to 5 AAC AS 16.05.870, ADF&G was directed to further refine the identification of anadromous fish water bearing bodies by specifying which portions of anadromous water bodies that were important for spawning, rearing, or migration of anadromous fishes. Specifications were made utilizing listings in each of six regional *Catalog of Waters Important to the Spawning, Rearing, or Migration of Fishes* and its associated Atlas, An Atlas to the *Catalog of Waters Important to the Spawning, Rearing, or Migration of Fishes* in the 1982 revision (collectively referred to as the Atlas and Catalog or AWC) which displays the extent of documented anadromous fish presence and the life stage observed, while the Catalog contains a listing of the specified water body by assigned number, name, and the latitude, longitude and legal description (meridian, township, range, and section) of the mouth and uppermost point of documented anadromous fish distribution. Also included is fish species and life stage information for the water body. The following sources of information were used for the 1982 revision of the *Atlas* and *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes*: Alaska's Fisheries Atlas (McLean and Delaney 1978), ADF&G field notes from area and regional offices, various ADF&G; U.S. Forest Service; U.S. Fish and Wildlife Service reports; Revised Anadromous Fish Stream Catalog of Southeastern Alaska (Edgington 1977 - 1985) Bureau of Land Management survey notes; and Index to North Slope Stream and Lake Surveys (Bendock 1982). The last update to the AWC by ADF&G Habitat and Restoration Division in 1998, listed 13,887 rivers or streams, and 1,322 lakes.

In 2003, Executive Order 107 transferred authority of several Alaska Statutes from ADF&G to ADNDR, such as AS 16.05.840, renumbered as AS 41.14.840 requires

construction and maintenance of a fishway and a device for efficient passage of downstream migrants for any dam or other obstruction built across a stream frequented by salmon or other fish, the submission of plans and specifications for review and approval by ADNR and that the structure be kept open, unobstructed, and supplied with enough water to maintain the free and efficient passage of fish through it. If a fishway is determined by the deputy commissioner to be impractical, *AS 41.14.850* allows for the owner/applicant to compensate for the loss resulting from the dam or obstruction by paying a lump sum acceptable to the deputy commissioner to the fish and game fund; convey a site and construct a new hatchery and all related facilities; or fund the expansion, maintenance, and operation of an existing hatchery.

Permitting functions described in AS16.05.870, which was renumbered as AS 41.14.870 due to the transfer of permitting authority now requires ADNR to “specify” or list, “the various rivers, lakes, and streams or parts of them that are important for the spawning, rearing, or migration of anadromous fish.” It also requires anyone wanting to construct a hydraulic project, or use, divert, obstruct, pollute, or change the natural flow or bed of a specified water body, or operate a vehicle in these specified water bodies to contact ADNR for written approval before beginning the construction, activity, or use. The department may require additional information in order to fully evaluate potential impacts to fish and game resources. Required information includes full plans and specifications for the proposed construction, activity, or use and a list of measures for protecting fish and game resources affected by the proposed activity.

If the deputy commissioner (or deputy commissioner’s authorized representative) determines that the plans and specifications provide for the proper protection of fish and game, ADNR Office of Habitat Management & Permitting will issue written approval, in the form of a “Fish Habitat Permit,” authorizing the proposed use or activity. In the case of a denial, the applicant may seek a hearing under AS 44.62.370.

In spite of these regulatory changes the ADF&G maintains the anadromous waters data in the Fish Distribution Database (FDD) which is utilized to publish the AWC. ADF&G is responsible for maintaining the database as well as preparing and publishing Atlas maps and regional catalogs. ADF&G and ADNR work together in the preparation, publication, and regulatory adoption of the Atlas and Catalog. Because of the close relationship between the FDD and AWC, and that changes to one are reflected in another, the abbreviation “FDD/AWC” will be used when referring to actions that will affect both. Procedures relating to DNR’s regulatory process and the actual Atlas and Catalog will be referred to the AWC, while those related to ADF&G database will be referred to the FDD (AWC was the term used to refer to the ADF&G Atlas maps, regional catalogs, and related databases prior to the implementation of Executive Order 107 in 2003).

The FDD/AWC currently documents over 16,000 streams, rivers or lakes around the state which have been specified as being important for the spawning, rearing or migration of anadromous fish. Based upon thorough surveys of a few drainages it is believed that this number represents less than 20% of the streams, rivers and lakes actually used by

anadromous species. It is estimated that at least an additional 20,000 or more anadromous water bodies have not been identified or specified under AS 41.14.870(a).

The AWC is important because it specifies which streams, rivers and lakes are important to anadromous fish species and therefore afforded protection under AS 41.14.870. Water bodies that are not "specified" within the AWC are not afforded that protection. To be protected under AS 41.14.870, water bodies must be documented as supporting some life function of an anadromous fish species (salmon, trout, char, whitefish, sturgeon, etc.) Anadromous fish must have been seen or collected and identified by a qualified observer. Most nominations come from ADF&G fishery biologists. Additional nomination forms are received from private individuals, companies and biologists from other state and federal agencies.

PAST GOALS

AWC Operations Plan and Status FY03 (Weiss 2002) listed the following goals.

- (1) The continued revision and production of the Atlas and Catalog;
- (2) Revisions and implementation to the AWC GIS database and programs;
- (3) Finalizing the conversion of the paper Atlas data to digital data;
- (4) The design and implementation of internet based services;
- (5) Upgrades to existing AWC auxiliary databases and user functions.

Each of these goals are related and in some cases work on one directly impacts effort on another. Descriptions and status of each are included below.

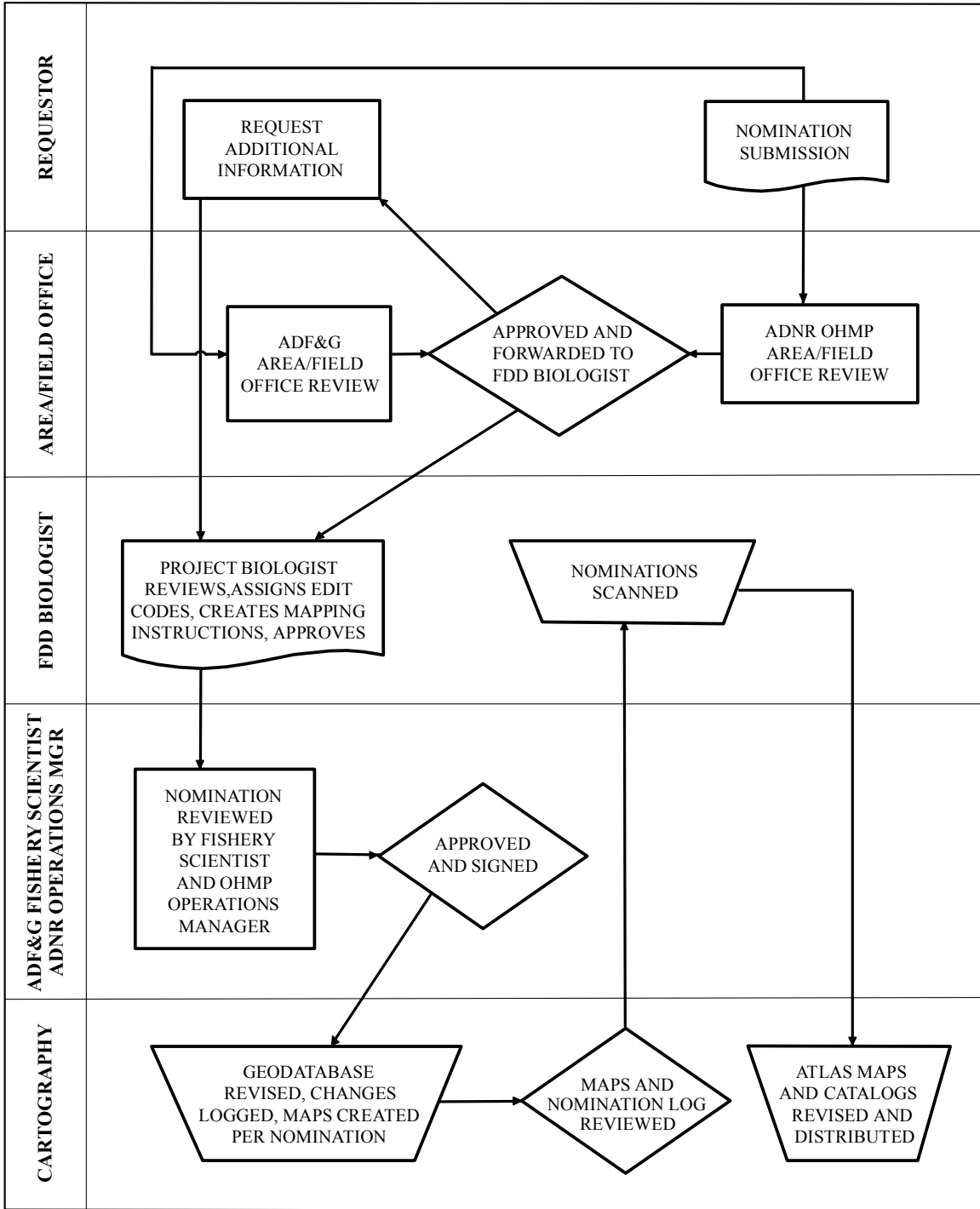
Atlas and Catalog Revision and Production

The FDD/AWC revision and production involves numerous tasks (Table 1, Figure 1).

Table 1. FDD/AWC Revision and Production Timeline 2007 - 2008.

Activity	Projected Completion Date
Call for nominations ends	September 29, 2007
FDD Biologist review nominations	October 31, 2007
ADF&G and ADNR Review	November 15, 2007
GIS drafting of revisions	December 1, 2007
Draft Atlas maps reviewed	December 10, 2007
Preparation of draft maps and catalog text	December 15, 2007
Public review begins	January 29, 2008
Public review ends	March 6, 2008
Adoption documents to ADNR	March 25, 2008
Adoption documents to Dept of Law	April 29, 2008
Regulation signed by Lt. Governor	May 2, 2008
Regulations Effective	June 2, 2008

Figure 1. FDD Nomination Process



The 1998 revision AWC revision and production was the last by ADF&G Habitat and Restoration Division and occurred in February 1999. The next revision and regulatory update to the AWC was scheduled to take place during FY 03, preferably before December 31, 2002. However, due to a number of factors, the next revision and regulatory update to the FDD/AWC did not take place until January 15, 2005. The 2005 update incorporated observations from 1,331 nominations that had been received by ADF&G from 1999 through April 2004 adding 789 water bodies to the FDD/AWC. With the 2005 update a total of 104,359 kilometers of anadromous fish bearing streams were documented in the FDD/AWC. The next revision and regulatory update to the FDD/AWC which occurred on March 1, 2006 and was based on data from 359 nominations received during 2004 and 2005 which added 397 water bodies to the FDD/AWC and increased the total distance of documented anadromous fish bearing streams by 6,985 km to 111,334 km. A second 2006 revision and regulatory update to the FDD/AWC from 403 nominations took place on September 1, 2006, adding 94 water bodies to the FDD/AWC and increased the total distance of documented anadromous fish bearing streams by 282 km to 111,625 km.

GIS Database Revision and Production

Funding from Coastal Alaska Salmon Habitat Information System (CASH IS) from Southeast Sustainable Salmon Funds (SSSF) was utilized to identify needed revisions to the databases and associated programs for editing and updating the FDD/AWC. A number of revisions were identified and made by ADF&G Analyst Programmer staff. One revision came in the form of the creation of programming tools which facilitate identification and correction of inconsistencies in FDD data used to track nomination submission and documentation. Through the use of these tools, discrepancies such as duplicate or incomplete nomination information were identified and corrected. Online nomination, through the FDD website has also been added, with the ability to attach supporting documents such as spreadsheets and photos. All historic and newly received nomination forms have been scanned as PDF files and are accessible through the website as well as query tools to associate nomination number with water body AWC number or name, Fish and Game Resource Management region, U.S.G.S quadrangle, sampling date, or anadromous fish species.

Conversion of the paper Atlas data to digital data

Atlas maps which display the known extent of documented anadromous fish distribution along with AWC water body number and fish species information were only available in paper form through 1998. Beginning in 1993 the department developed regional databases which include AWC hydrography and fish species attribute information. Database information was utilized to create GIS geodatabases which facilitate production of full color maps as well as construction of arc, point, and polygon data layers (shapefiles) that could be made available for distribution. Other information such as location of barriers to fish movement, regional and statistical area boundaries, and lake location information have also been incorporated into electronic form. Digital conversion of all Atlas maps was completed in 2006.

Internet Based Services design and implementation

SSSF funds were used to fund the design and implementation of an AWC/FDD Internet Map Service (IMS) website. Through the IMS site, users can identify locations and fish species documented within anadromous fish bearing streams. Other map layers available for display included major roads, Legislatively Designated Special Areas, and ADF&G Game Management Areas. In addition to the IMS web site, the department offers the user access to a range of information. The FDD homepage provides a brief description of the FDD program, contact information, and various links which further describe the FDD program, Anadromous Waters Catalog and Atlas guide, identification of the regional boundaries, instructions on how to interpret information in the AWC Atlas maps and Catalog, the sources of information found in the AWC, and procedures to submit updates to the FDD/AWC.

Also included are descriptions of terms used in the AWC Catalog, profiles of anadromous fish species included in the FDD/AWC and capabilities to view and download full color versions of regulatory access maps; download anadromous fish distribution regional shapefiles which include point and arc data as well as metadata files; which provides information about the data; view and download copies of the most recent AWC Catalogs; download nominations forms and instructions and guidelines for nomination submission; and search, view, and download historic nomination information, and online nomination submission.

Upgrades to existing AWC auxiliary databases and user functions

Since the early 1990's several of the processes associated with the AWC have been upgraded or automated through the development of an FDD auxiliary database. This database has been developed and maintained to assist in the tracking of nominations, tracking of revisions to the FDD, QA/AC checking of the AWC data and providing information and data in respond to requests for information from dept staff, ADNR OHMP biologists, and the general public. Initially this database was developed in RBASE, then moved into MS ACCESS and finally to it's most recent platform as an SQL database. SQL database was restructured and integrated with an intranet web page to provide ADF&G staff access to historic nomination submittals, historic edits and catalog listings as well as permit and escapement data where they exist. However, the Intranet site is being phased out as many of the functions found there have been added to the FDD website.

PRESENT OBJECTIVES

- (1) Continue annual revision and production of Anadromous Waters Catalogs and Atlas maps;

- (2) Update and maintain the Fish Distribution Database to insure the documentation of spawning, rearing, and migration habitat of anadromous fish species of primary importance to sport fishing, commercial, and subsistence fisheries;
- (3) Continue upgrades to internet based services;
- (4) Pursue cooperative programs and maintain partnerships that could assist the department in identifying undocumented anadromous fish bearing streams and adding them to FDD/AWC;
- (5) Develop geographic data-sharing protocol across the regions with cooperating entities to ensure data standardization that facilitates updates/edits to the National Hydrography Database (NHD).

Atlas and Catalog Revision and Production

The 2007 update from 961 nominations to the FDD/AWC will add 235 water bodies to the AWC and increase the total distance of documented anadromous fish bearing streams by 466 km to 112,091 km. The next call for nominations for the 2008 update will begin September 1, 2007. Yearly update of the FDD/AWC will continue as an annual goal.

Update and Maintain the FDD

Continue revision to the FDD through the nomination process and substantiation of anadromous fish species and life stage information in water bodies listed in FDD/AWC, especially those water bodies where initial nomination information is dated, incomplete, or entirely lacking is vital. Web-based nomination submission, tracking, and review have all been incorporated onto the FDD web site to simplify the nomination process. Included on the FDD Nomination Submission website are instructions for completing nominations and Guidelines for Nomination Submission. Nomination submission instructions were recently revised to include instructions for adding polygons to the FDD/AWC. Web-based FDD utilities have also been created which identify problem nominations. Problem nominations are defined as orphaned nominations which exist in the changes table, the f-nomination table ('f-nom' applies to backup or other supporting nominations that do not result in revisions to FDD), or both but not in nomination table or as 'lazy' nominations that are listed in nomination table but not listed in the changes table or the f-nom table. Duplicate nomination entries appear in both changes table and f-nom table. Use of these utilities has facilitated identification of thousands of incomplete, incorrect, or missing entries in each of the three tables. Once discrepancies were identified, other tasks had to be accomplished to simplify correction. While ADF&G does maintain paper file copies of all nominations received, the method of filing nomination by United States Geological Survey (USGS) ITM quadrangle made locating specific problem nominations difficult. To remedy this, all nominations on file were reordered by nomination number. Once rearranged, in order by number, each nomination was reviewed and compared to table

entries to ensure the accuracy of individual entries. This review facilitated elimination of orphaned, lazy, or duplicate nominations and correction of erroneous entries.

Once erroneous table entries were corrected, a comprehensive table was created which combined entries from the changes and f-noms table. The resulting table was then joined to ESRI ARCGIS arc shapefile attribute table to relate nomination information to specific water bodies listed in the FDD. Results of this comparison indicate that 7,515 of the 16,715 water bodies (45%) listed in the FDD are not substantiated with nomination information (Table 2).

Table 2. Numbers of total and undocumented FDD water bodies by region

Region	# Anadromous water bodies	#Undocumented water bodies (%)
Arctic	1,122	506 (45)
Interior	1,322	968 (73)
Southcentral	3,764	1,006 (27)
Southeastern	5,997	2,942 (49)
Southwestern	3,471	1,326 (38)
Western	1,039	767 (61)
Total	16,715	7,515 (45)

Many of these unsubstantiated water bodies may have been included in historic versions of the AWC before a nomination process existed.

Documentation of Existing FDD entries

Given the large number of unsubstantiated water bodies listed in the FDD, an effort is currently underway to confirm that the each water body currently listed in the FDD/AWC is still important for the spawning, rearing, or migration of anadromous fish. After unsubstantiated water bodies have been identified by region, each would be researched in ADF&G literature to identify possible historic references. If no historic documents can be identified, lists of unsubstantiated water bodies will be sent to ADF&G area and field offices as well as other local, state, or federal agencies to determine if any anadromous fish presence data concerning each of the unsubstantiated water bodies can be located. Presently a pilot project is underway to assess the scope of the problem for water bodies in Southcentral (Susitna, Matanuska and Kenai Peninsula watersheds), Southwestern (Kuskokwim River watershed) and Southeastern Alaska (Yakutat area). Other areas of the state will be reviewed as well at some future date.

To assess the ability of local office department staff to assist with the substantiation effort, Commercial Fisheries and Sport Fish Divisions Regional Supervisors have been contacted to explain the project and request information regarding availability of local staff to participate. Once participation level has been established, a timeline will be developed to identify and substantiate the unsubstantiated water bodies within each area of responsibility. The best approach would be to establish sampling needs within each Resource Management Region by watershed or larger geographic area depending on the management and research responsibilities of the area or field office department staff. The first step would be to establish the area of responsibility for each area or field office then identify the unsubstantiated water bodies within geographic area. Once identified, the next step would be to determine which if any of the anadromous fish species found in the unsubstantiated water bodies have been sampled in some fashion over time (enumeration utilizing weir, aerial, foot, or scuba survey). If relatively recent sampling data documenting the presence anadromous fish exists for the unsubstantiated water body, this information can be utilized to generate a nomination to substantiate the water body's listing in FDD/AWC. For those unsubstantiated water bodies for which no sample data exists, an area sampling plan would have to be developed to document the presence of anadromous fish species.

Within Southeastern Alaska approximately 50% of the water bodies listed in the AWC are not substantiated with nomination information. It is believed that many of these unsubstantiated water bodies are in fact survey streams for which nomination forms were never submitted. To determine if this is the case, information in cross reference tables of ADF&G Commercial Fisheries stream number and AWC number will be compared to current FDD listings to determine if survey information exists that would substantiate water bodies' inclusion in FDD. If so, nomination forms will be completed to add supporting or backup information to FDD. Survey streams without corresponding AWC number will be located to determine if the water body can be added to FDD/AWC.

Utilization of ADF&G Activity Data to Add to and Document FDD

The annual call for nominations also includes a request to ADF&G personnel to provide lists of water bodies, such as weir locations, aerial or foot survey streams in their respective areas (Table 3).

Table 3. Statewide Stock Assessment Survey Activity by ADF&G Office.

Area/Field Office	Data Description
Anchorage	Statewide Hatchery Locations - Government & Private, Escapement survey counts of adult salmon for systems whose confluences with Cook Inlet occur between Point Campbell and Magot Point (Knik Arm), ADF&G Statewide Sonar Sites, Escapement Survey Counts of Adult Salmon for Systems in the Turnagain Arm Drainage

Table 3. continued.

Area/Field Office	Data Description
Bethel	Kuskokwim River Aerial Survey Locations, Kuskokwim River Weir Locations
Cordova	Copper and Bering River Aerial Survey Stream Locations, Prince William Sound Aerial Survey Streams
Dillingham	Dillingham ADF&G Camp Sites
Douglas	Southeastern AK Commercial Fisheries Survey Streams
Dutch Harbor	Dutch Harbor Foot Survey Streams
Homer	Homer ADF&G Weir and Sonar Sites
King Salmon	Adult Salmon Counting Projects in the Bristol Bay Area
Kodiak	Alaska Peninsula List of Salmon Streams, South Alaska Peninsula List of Salmon Streams and Noted Presence of Salmon by Species, North Alaska Peninsula list of salmon streams and noted presence of salmon by species, Westward Region Camp Sites
Palmer	Palmer Sport Fish Weir Sites, Escapement Survey Counts of Adult Salmon for Systems in the Yentna River Drainage, Escapement survey counts of adult salmon for systems in the Chulitna River drainage, Escapement Survey Counts of Adult Salmon for Systems in the Talkeetna River Drainage, Escapement Survey Counts of Adult Salmon for Systems in the Western Cook Inlet Drainage
Soldotna	Escapement Survey Counts of Adult Salmon for Systems Whose Confluences with Cook Inlet Occur Between Point Possession and the Anchor River, Kenai River System Area Survey Locations, Escapement Survey Counts of Adult Salmon for Systems in the Kenai River Drainage.

Each report or table received was examined and a statewide activity table created which included stream or lake name, activity (weir, sonar site, aerial survey), fish species observed, and location information such as latitude and longitude. Once compiled, the information was overlaid over existing FDD/AWC stream information. From this comparison, it was found that a number of water bodies identified in existing reports and historic tables are not documented in the FDD/AWC. Efforts are currently underway to confirm location and species information with local department staff and add substantiated water bodies to FDD/AWC. Once site information such as location and fish species presence has been confirmed an ADF&G activity shapefile will be created and added to the FDD IMS website. As fish species information is confirmed, any species found at the site but not included in the FDD/AWC will be added through the nomination process. A literature review of past studies could also serve as a source of revisions to the FDD/AWC.

Another source of revisions to the FDD has been observations made by department employees during inventories of resident and anadromous fish distribution conducted in the Bristol Bay and Cook Inlet drainages during 2003, the Seward Peninsula, and Tanana and Central Yukon drainages during 2004, and Nushagak River drainage in 2005 and 2006 as a part of the ADF&G Alaska Freshwater Fish Inventory (AFFI) project. All fish species observations are initially added to the AFFI database. A database nomination tool is used which extracts from the data tables' relevant information needed to print nomination forms for those fish species observations that could result in revisions to the FDD/AWC (Buckwalter 2007). A large number of the nominations submitted from sampling conducted from 2003 through 2006 resulted in revisions to the FDD or substantiated previous observations of anadromous fish presence in the water bodies sampled. Sampling is scheduled to occur in the Upper Kuskokwim during 2007 and will target a subset of area streams, comprising the longest stream segments not currently listed in the FDD/AWC. For water bodies already listed in the FDD/AWC, fish inventory efforts will focus on documenting the diversity of anadromous fish species and life stages present.

Use of ADF&G Radio Telemetry to Add to and Substantiate FDD

Additional ADF&G radio telemetry data from work conducted during 2004 and 2005 has been used to generate nominations to the FDD. Fish track information from studies of sockeye salmon in the Susitna River drainage, and Chinook salmon in the Kuskokwim River and Koyukuk River drainages was compared to existing FDD information and reviewed. From this examination, potential revisions to the FDD in the form of extending or adding new streams or new species were identified and nominations were generated. Fish track information from studies of radio tagged sockeye salmon in the Susitna River drainage, and Chinook salmon in the Kuskokwim River drainage from sampling during 2006 has been received and will be similarly reviewed. In addition, 2006 sockeye salmon radio telemetry and juvenile Chinook salmon data collected since 2000 from the Kuskokwim River drainage by ADF&G Sport Fish Division will be reviewed to determine whether anadromous fish species were observed in water bodies not listed in the FDD.

One means to facilitate assistance from local ADF&G staff would be to provide short term funding for local staff personnel who could then dedicate part of their time to researching unsubstantiated water bodies or even conducting sampling in area water bodies to confirm anadromous fish life stage use. Any data supporting the continued inclusion of the water body in the FDD/AWC will be added to the FDD database as a supporting or F-nom information. Any unsubstantiated water body could ultimately be removed from the FDD/AWC through the nomination process if documentation of anadromous fish presence could not be confirmed either through literature review or information from area ADF&G staff. During FY07 funding was provided for one Kuskokwim area Fish and Game Biologist which was used to collate and summarize the existing data. Working over a two-week period, 16 nominations were generated which will be used to substantiate existing FDD/AWC water bodies or will result in additions or corrections to the FDD/AWC.

Revision of Species String Information

Another aspect to updating the FDD/AWC is revising general fish species information where more specific information exists. While Pacific salmon listed in the FDD are identified to species, other anadromous fish such as smelts, whitefish, except for sheefish, and lampreys are listed generally such as smelt, undifferentiated. Anadromous smelts (species group), broad whitefish, Bering cisco, and lampreys (species group) among other fish species are featured in the recent publication of the Alaska's Comprehensive Wildlife Conservation Strategy (CWCS) and are included in the list of Alaska's "Species of Greatest Conservation Need". The CWCS specifically identifies these species and conservation concerns related to the sustainability of these species. Given the general lack of knowledge regarding the life histories, distribution and abundance of these species, and in an effort to properly manage and protect these fishery resources, it is critical that through the state's information database and survey efforts these species receive equal representation with Alaska's other anadromous species.

A review of historic nominations for smelt found that in nine water bodies listed in the FDD, smelt were identified as either eulachon or rainbow smelt. Once identified, new species codes were created and species string information was revised in the FDD. An effort is also underway to add eulachon or other smelt species to water bodies listed in the FDD. A literature review has identified at least 40 streams throughout the state with known eulachon presence not documented in the FDD. Once eulachon presence is substantiated by local ADF&G staff, fish species information will be revised. A similar review was conducted for whitefish nominations. Whitefish are documented in 541 water bodies listed in the FDD. Whitefish species were identified as least arctic, or Bering cisco, or as round, humpbacked, or broad whitefish in 485 streams. A review of the FDD database identified 142 nominations with specific information identifying whitefish to the species level for 284 water bodies (lakes, rivers, and a single polygon). An examination of each nomination form found that species or location information supplied was specific enough to warrant changes to whitefish species annotation for 71 water bodies which span some 96 ITM (1:63,360 scale) maps. Most changes were from Whitefish, undifferentiated to humpback or broad whitefish or least cisco or Arctic cisco. While

lamprey had been included in the AWC definition of anadromous fishes since 1982, lamprey had not been included in the FDD until 2006. Lamprey not specifically identified as Arctic, river, or Pacific lamprey is listed as lamprey, undifferentiated.

Recently a number of nominations were submitted to add the presence of Dolly Varden to water bodies in the Nushagak drainage. While those nominations were initially accepted and processed to be added to the FDD/AWC, after review by ADF&G Fishery Scientist Robert Clark and OHMP Operations Manager it was determined that it would be inappropriate for nominations that would change Arctic char (AC) to Dolly Varden (DV) to go to public notice for inclusion in the FDD/AWC until such time as ADF&G can provide sufficient and substantiating supporting information that strongly indicates that these streams support anadromous Dolly Varden. Supporting information that would be useful includes but is not limited to the following:

- historical data that would support these are anadromous Dolly Varden;
- identification of specific locations within the drainage where there are documented anadromous Dolly Varden;
- descriptions (including photographs) of adult Dolly Varden that would provide direct evidence that the fish is anadromous;
- collection of Dolly Varden that would be described as smolts (i.e., silver)
- otolith microchemistry results from juvenile Dolly Varden that would clearly indicate that the female parent was anadromous;
- otolith microchemistry of large Dolly Varden in specific reaches of the drainage that would clearly indicate that they are anadromous;
- supporting information or literature references on the validity of the otolith microchemistry data to determine anadromy of the female parent; and
- any other information that would support the nominations for Dolly Varden in the Nushagak River drainage, including its headwater streams.

The department has classified the submitted Dolly Varden nominations as ‘F-noms’ which are defined as those nominations that were declined pending further information.

Internet Based Services

Information from tables used to track the nomination outcome and ARCGIS shapefile attribute table has been combined to create nomination reports for each water body. Report information for each water body will include location information such as Resource Management Region, such as the Arctic Region and USGS ITM quadrangle along with nomination number and revision information. Report feature also allows online viewing of the nomination form or downloading of the PDF file.

Cartographic staff is creating a lake shapefile which will then be used to display lake location and mapped shape (polygon) rather than as a single point. The resulting shapefile can also be used to calculate lake area of selected anadromous fish bearing lakes. The completed lake layer will be added to IMS site.

Additional Internet services as well as refinements to existing services are driven by software upgrades and individual requests. Cosmetic changes to the IMS web site legend and adding a new toolbar help system are planned. Additional layers (ADF&G Game Management Areas, Legislatively Designated Special Areas) are added to the IMS website as requested. New to the site is a map layer that will allow the user to identify and query changes to the FDD data between updates. Another recent addition to the IMS site are layers which display locations of ADF&G activities such as weir, sonar, counting counters or state operated fish hatcheries. Links between activity layer location symbols make it possible to display current weir, counting tower, or sonar site by clicking on a site. Queries can be able to be made by region, 1:250,000 or 1:63,360 scale USGS quadrangle maps, AWC number, fish species, year, or change made. As the IMS software evolves and new features are added, it is expected that the FDD IMS website will incorporate those features that will further enhance the user based functionality.

Cooperative Programs

Fish Resource Permit (FRP) reports have been identified as a possible source of FDD information. During 2006, a number of reports were examined for anadromous fish distribution information not documented in the FDD. Fish Distribution information not documented in the AWC/FDD was identified in two reports. In each case, the principle investigator provided information which resulted in revisions to the FDD. To ensure continued cooperation, stipulations are being included in 2007 Fish Resource Permits which require that the permit holder work closely with ADF&G to nominate any water bodies where anadromous fish species are newly found. Additional 2006 and 2007 Fish Resource reports are being reviewed to determine if proposed work could result in additions to the FDD. As FRPs are received sample data will be entered into a database to create a point shapefile which could then be used to plot sampling locations. Plotted points can then be compared to arc shapefiles that identify water bodies for which no nomination information exists. Matches between FRP points and water bodies without nomination information will be flagged as possible sources of revisions to the FDD/AWC.

Takshanuk Watershed Council (TWC) has identified the need for protection of numerous stream reaches supporting anadromous fish in local watersheds. In three years of field work, trapping young fish and collecting data, TWC staff has identified several first and second order anadromous streams that have not been mapped or recorded in the AWC/FDD. These waters are important to spawning and rearing of anadromous fish, which in turn, are keystone species in the coastal ecosystem as well as vital cogs in the regional economy. By documenting the numbers and species our smaller sub-basins support, TWC can help to protect them through a listing in the Catalog. TWC plans to conduct a systematic trapping and mapping project on all local streams and tributaries in the next five years. In the first year of the project, TWC will focus efforts on areas experiencing development pressure including State of Alaska Lands, Alaska Mental Health Authority Lands and subdivided private lands. At the conclusion of the project anadromous streams not listed in the FDD will be identified and nominated for inclusion in the Catalog and Atlas. The comprehensive geographic scope of the project and the cost-effective nature of the protection afforded by simply documenting the presence of anadromous fish in a water body make this effort a top priority for TWC. The department is assisting with this effort by providing technical information regarding sampling protocols and assist with the nomination of new water bodies to the FDD/AWC.

The Fisheries & Habitat Restoration Division of the Anchorage and Fairbanks Fish & Wildlife Field Offices (U.S. Fish and Wildlife Service) has an initiative to help fill any gaps in the Fish Distribution Database - Anadromous Waters Catalog and Fish Passage Inventory Database. Field documentation efforts are to be prioritized to address deficiencies in the FDD/AWC based on known threats to the resource. Emphasis will be given to documenting spawning activity and early life stage habitat utilization by anadromous fish species. Initial focus will be in waters within the Tanana, Yukon, Matanuska, and Susitna River watersheds with hopes to pursue other areas of the state in the future. The department is assisting with this effort by identifying potential sampling locations and providing information regarding water bodies not listed in the FDD/AWC and those listed in the FDD/AWC but lacking nomination information as well as with the nomination of new water bodies to the FDD/AWC.

National Hydrography Dataset Revisions

The USGS National Hydrography Dataset (NHD) is a comprehensive set of digital spatial data that contain information about surface water features stream hydrography. In the absence of more specific information on hydrography the department utilizes NHD hydrography to represent stream courses. During the course of their work, department cartographers have found instances where NHD hydrography does not accurately reflect the actual course of the stream or inaccuracies in the stream name. In these cases, the department uses the most accurate hydrography. While the NHD has been designed to identify, accept, and track updates, the policies and procedures to do this have not been fully developed. In the past, place name inaccuracies have been reported to the local office of the USGS. Beginning with the upcoming update, department cartographers will note instances where mapped hydrography differs from the NHD and a shapefile will be maintained which will be made available to USGS.

The USGS is developing a tool that will provide step-by-step instructions on how to verify accuracy of place names, how to edit the actual data, and how to build a ‘status’ table that will identify which features are edited and the type of edits.

The USGS hosted a nationwide conference on the stewardship of the NHD in Denver, Colorado April 24-26, 2007. Stewardship is the process by which the NHD will be maintained by the user community in the future.

The goal of the conference was to (1) provide information needed to develop a successful stewardship program; (2) provide a platform in which stewards can voice their feedback and ask questions; and (3) give stewards an opportunity to network, develop contacts, and learn from each other.

At present discussion is underway between user agencies to decide which agencies would be best suited to act as stewards for the State of Alaska. The department is currently maintaining a file of reported discrepancies in the NHD data which will be provided to USGS once a standardized procedure has been developed. Cartographic staff will be afforded the opportunity to attend training classes related to NHD editing as needed. In the interim, the department will utilize a USGS web-based service established to identify errors in the NHD that require consideration for correction.

REPORTING AND PERSONNEL

Fish Distribution Database and Atlas Sport Fish Investigations Study is funded through a combination of federal (Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under Grant No. AK F-10-22, Study Number H-09 and Fish and Game funds. A synopsis detailing future needs and performance report is submitted annually.

PROJECT PERSONNEL: FY 07 & FY 08

PCN	Name	Level	Months FY 07/FY08
11-6052	J. Johnson	Habitat Biologist III	12.0/12.0
11-6118	C. Barnhill	Cartographer IV	8.5/9.0
11-6119	F. Inoue	Cartographer IV	5.5/5.6
11-6087	R. Snow	Analyst/Programmer IV	2.0/3.0
Total			27.5/29.6

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APPENDIX A. NOMINATION SUBMISSION INSTRUCTIONS

BACKGROUND AND INSTRUCTIONS ON NOMINATING A WATER BODY TO THE ADF&G FISH DISTRIBUTION DATABASE ONLINE

The following explains the procedures for nominating streams, rivers or lakes for inclusion into the Fish Distribution Database Atlas and Catalog

Background

Due to regulatory changes in 2003, Alaska Statute 41.14.870(a) requires the Alaska Department of Natural Resources (ADNR) to "specify the various rivers, lakes and streams or parts of them" of the state that are important to the spawning, rearing or migration of anadromous fishes. The *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* and its associated atlas (the Catalog and Atlas, respectively) were the media used to accomplish this specification and are adopted as regulation under 11 AAC 195.010. Because of the regulatory changes the *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* and its associated atlas have been renamed the Fish Distribution Database Atlas and Catalog. ADF&G will continue to receive and process stream nominations while ADNR will be responsible for initiation of the regulatory process for adoption of maps depicting anadromous streams and catalogs describing stream locations into state regulation. Activities and uses conducted in, or otherwise affecting, any of the waters specified in the catalog require prior approval from the ADNR for most areas of Alaska or ADF&G for activities in state designated "special areas". Activities and uses requiring approval range from fording streams with vehicles to constructing complex bridge or hydroelectric projects. DNR is now responsible for reviewing project plans and specifications submitted by permit applicants for proposed uses or activities in most areas of the state. Habitat Biologists with Sportfish Division are still responsible for permitting activities in special use areas such as state critical habitat areas, game refuges, and sanctuaries. If project plans provide for the proper protection of fish habitat, a Fish Habitat Permit is issued authorizing the activity.

Applications for activities that would damage fish habitat are not approved or are approved with stipulations to mitigate adverse impacts.

The Catalog and Atlas are important because they specify which streams, rivers, and lakes are important to anadromous fish species and therefore afforded protection under AS 41.14.870. Water bodies that are not "specified" within the Catalog and Atlas are not afforded that protection. To be protected under AS 41.14.870, water bodies must be documented as supporting some life function of an anadromous fish species (salmon, trout, char, whitefish, sturgeon, etc.). Anadromous fish must have been seen or collected and identified by a qualified observer. Most nominations come from Department of Fish and Game fisheries or habitat biologists. Others are received from private individuals, companies and biologists from other state and federal agencies.

The Catalog and Atlas currently contain around 15,000 streams, rivers or lakes around the state, which have been specified as being important for the spawning, rearing or migration of anadromous fish. Based upon thorough surveys of a few drainages it is believed that this number represents less than 50% of the streams, rivers and lakes actually used by anadromous species. It is estimated that at least an additional 20,000 anadromous water bodies have not been identified or specified under AS 41.14.870(a).

Process

The ADF&G accepts nominations for additions or changes to the Catalog and Atlas year round, with a formal call for nominations occurring in September and October of each year. Persons wishing to nominate streams, rivers or lakes to the Catalog and Atlas submit nomination forms to the ADF&G Sportfish Division office located at 333 Raspberry Road in Anchorage. Fisheries field crews can assemble nominations for streams identified during the field season for submittal during the formal call. Nominations are sent to the project biologist for processing; following review the nomination is sent to appropriate regional supervisor for their review. After area and regional review, nominations are compiled and checked for completeness and accuracy. Incomplete nominations are returned to the

submitting party for completion or additional information. The ADF&G assign the approved nominated waters a nomination number. The Habitat Biologist in charge of the Fish Distribution Database project then reviews, approves, and prepares mapping instructions. Nominations are then submitted to the cartography staff so annotations can be added to base maps. Maps are printed and reviewed to ensure annotations reflect the latest nomination information. Following final approval the stream data is added to a GIS database. Nominations returned to their originators for additional information are included in this process as the completed nominations are returned to the ADF&G.

ADF&G then sends draft Atlas maps and proposed Catalog changes to its area offices for a combination “in-house” and public review. Public notification that the department is amending the regulations pertaining to the Atlas and Catalog (11 AAC 195.010) is published in various newspapers statewide and is supplemented by mailings to interested parties. The public may review and comment on the revised Atlas maps and Catalog entries at most area offices during this period. Area biologists also review the maps at this time to ensure accuracy with their original submissions. Needed corrections are forwarded in writing to the Fish Distribution Database Project Leader in Anchorage. The public review and comment period lasts at least 30 days and normally takes place in February and March. Comments received from the public during this period are provided to regional biologists with specific expertise in the pertinent area and, if confirmed, are incorporated into the Catalog and Atlas.

Following the public review period and any resulting changes, the regulation adoption orders are submitted to the Attorney General's office and the Lieutenant Governor for review and adoption into regulation by ADNR. Thirty days after being signed and filed by the Lieutenant Governor the revised regulation (11 AAC 195.010) becomes effective which then "specifies" the nominated streams. Finally, the newly revised catalogs are published and the maps that were provided during the review process are added to the area offices' Atlases. Any maps, which were changed as a result of the public review, are also made available at this time.

Nomination Form Instructions

Although the form is fairly self-explanatory the following instructions apply.

- AWC Region** Enter the appropriate ADF&G fish and game resource management region in which the water body is located (Arctic, Interior, Southcentral, Southeastern, Southwestern, or Western,).

- USGS Quad** Enter the U.S. Geological Survey 1:63,360 scale quadrangle map(s) in which the nominated portion of the water body is located. If the nominated water body is located on more than one quad, first list the quad, which contains the stream's mouth followed by the other quad(s) in an upstream sequence. Drop down listings of regions is provided. Drop down listings of regions is provided. If you are not sure of the region select unknown.

- Number of Waterway** For previously cataloged waters, enter the water body number as listed in previous versions of the Atlas and Catalog. For previously un-cataloged waters, enter the number for the cataloged water that the new water body flows into. This number will form the prefix for the number of the nominated stream. If unknown the space may be left blank. Drop down listings of regions is provided. If you are not sure of the region select unknown.

- Name of Waterway** For named water bodies enter the name as it appears on the USGS Quadrangle map and check the space to the right indicating a USGS name. If the water body is unnamed on the USGS maps but has a recognized local name, enter that name and check the space to the right indicating a local name. Drop down listings of regions is provided. If you are not sure of the region select unknown.

- Upper and

lower reach coordinates

Enter latitude and longitude of upper & lower extend of observed fish presence (decimal degrees i.e. 147.56 W, 61.258 N). If you are unsure of coordinates leave blank and click on “Find Location On Map” button. When statewide map appears, zoom into area of interest using magnifier or Region zoom. Zoom in until USGS topographical features appear. Click on Fdd Nomination Tool (left of FDD button at top). Fix upper point by placing cross hair at upper sampling location and left mouse click. A red dot should appear and coordinates will appear in window below map. Next, set lower point by placing cross hair at lower sampling location and left mouse click. A blue dot should appear and coordinates will appear in window below map. Click Submit button to enter coordinates onto nomination form.

- Nomination

Type

Check the appropriate space to indicate one or more of the following types of nomination submittal. Multiple types of changes may be included on one nomination form; however there should be a separate nomination form for each individual water body. If in doubt as to the type, leave it blank.

1. Addition

Use for the addition of previously uncataloged water bodies, addition of species or life phases of species using a cataloged water body, extension of the cataloged area of a previously cataloged water body, addition of a name to a cataloged stream, etc.

2. Deletion

Use for deletion of the above items or deletion of an entire water body.

NOTE: Deletions of water bodies, or portions thereof, or species within them should only be submitted if it can be demonstrated (through repeated yearly surveys) that anadromous fish use has not occurred for a number of years or that the water body or portion thereof is inaccessible to anadromous fishes due to a permanent natural or authorized manmade blockage.

3. Correction To nominate corrections to existing information within the Catalog or Atlas such as errors in species symbols; water body numbers; stream mouth locations, upper reach, or channel locations which are no longer accurate; etc. This is for changes to inaccurately depicted information rather than changes in anadromous fish usage.
4. Backup this is for submittal of survey or anadromous fish use information for water bodies or portions of water bodies that are already cataloged. This additional information is particularly helpful for water bodies, which have appeared in the Catalog and Atlas for many years but are not regularly surveyed as part of a fisheries management program.

**- Observation
Information**

Fill in all species observed, dates observed, and numbers observed for each life phase observed. We would like to receive information on all species encountered during your surveys. Only the anadromous species will be entered into the Atlas. The information on non-anadromous species provides valuable resource information and will be compiled separately. Check the anadromous column to denote anadromous populations of listed species (i.e. to clarify nominations regarding Dolly Varden, Arctic Char, whitefish or other species which may have both anadromous and non-anadromous populations and to define which of the listed species are to be added to the Atlas). Drop down list of anadromous species is provided. If

your nomination involves more than four anadromous fish note those species as well as non-anadromous fish species, include those fish species in comments section of the nomination form.

**- Comments &
Other Info**

Provide any clarifying information available (e.g., the number of fish observed, behavior, type of survey conducted, location of survey data, soak hours for traps, CPUE, stream characteristics at survey site, etc.). Attach copies of the survey data, field notes or final report.

**- Signature
Block**

Observer is identified from log in information and IP address is used to validate the nomination so entry here is unnecessary. Forms for observations and nominations by ADF&G personnel of Biologist I level or higher are “signed” only by that biologist. Nominations submitted by lower level ADF&G personnel, personnel of another agency, or a member of the public also need to be confirmed by an ADF&G biologist (SF, CF, WC) responsible for the area in question. Fish Distribution Database Project Biologist will accomplish this. After you have completed form, mouse click on Submit. If you have forms to attach you will be prompted to do so. Once the nomination has been logged it will be assigned a nomination number. You will be notified what the nomination number is and you should use the nomination number to determine the status of you nomination.