STATUS OF BROWN BEARS AND OTHER NATURAL RESOURCES IN THE McNEIL RIVER STATE GAME SANCTUARY AND REFUGE

Annual Report to Alaska State Legislature

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Executive Summary

The McNeil River State Game Sanctuary was legislatively established in 1967. The sanctuary was established to provide permanent protection for brown bears and other fish and wildlife populations and their habitats so that these resources may be preserved for scientific, educational and aesthetic purposes.

In May 1991, the Alaska State Legislature passed legislation (AS 16.20.160), which expanded the McNeil River State Game Sanctuary and created the McNeil River State Game Refuge. The legislation became effective on January 1, 1993, when the Commissioner of Fish and Game certified the Paint River fish ladder as operational.

A nonconcurrence determination was made by DNR regarding a lease for a commercial enterprise at Chenik Head. The BLM notified the commercial operator to cease operations and remove all structures by September 2000 for final conveyance of lands to the state. The commercial operator has appealed the determination and has not removed the facilities as of this writing.

Division of Personnel requirements have led to reductions in the number of staff persons accompanying permittees to sanctuary bear viewing areas. In previous years, two staff frequently accompanied viewers, allowing staff to confirm sightings of individual bears. Observations of a bear by a single staff person are not sufficiently reliable for confirmed sightings. Therefore, the number of individually recognizable bears observed in the sanctuary is no longer collected or kept as a reference point for trends of the population.

A repeatable, statistically reliable method of determining trends by using maximum hourly counts of bears at McNeil Falls has been established as the technique for determining bear trend numbers. Analysis of data for this season appears to indicate that the bear population is below the established threshold limit and may be experiencing impacts from other resource uses or user groups. The long-term failure to meet chum salmon escapement goals may be a contributing factor to the declining trend.

Public use of the sanctuary averaged 7.8 persons/day, with 198 permittees (standby and drawing combined) visiting the sanctuary. This represents a decline in the average daily visitation and the total number of visitors from the 1999 season. A total of 1,322 applications were received for the 280 permits. The Department issued all 15 special use permits.

Estimated sockeye salmon escapement to Mikfik Creek was 10,910 fish. The estimated chum salmon escapement index for McNeil River was a dismal 18,600 fish. Sanctuary staff believe that the 2000 chum salmon escapement was less than the very poor 1999 estimated escapement. There was no commercial harvest in the McNeil subdistrict, so the entire Mikfik sockeye and McNeil chum return entered the respective drainages. The McNeil chum salmon escapement goal was not achieved for the twelfth straight year, however significant commercial fishing effort was directed at chum stocks in the Kamishak Bay District with approximately 67,000 fish harvested. There is no information available to determine if some of this chum harvest were fish destined for McNeil River.

Introduction

The sanctuary was established to (1) provide permanent protection for brown bears and other fish and wildlife populations and their habitats so that these resources may be preserved for scientific, aesthetic, and educational purposes; (2) manage human use and activities in a way that is compatible with the permanent protection of brown bears and other purposes described in (1) and, to manage uses and activities that would maintain and enhance the unique bear viewing opportunities within the sanctuary; and (3) provide opportunities that are compatible with (1) for wildlife viewing, fisheries enhancement, fishing, temporary safe anchorage, and other activities.

The refuge was established for similar, but somewhat different purposes. The differences are that human uses and activities in the refuge are to be managed to maintain and enhance the unique bear viewing opportunities within the sanctuary, that opportunities for brown bear hunting shall be determined by the Board of Game, and that mineral entry is allowed.

The statute requires the Commissioner of Fish and Game submit an annual report to the legislature regarding status of brown bears and other fish and wildlife resources within the sanctuary and refuge and effects of fishing and fishery enhancement activities on these resources. This report is provided in response to that requirement.

Land Status

All land in the established refuge, sanctuary and sanctuary extensions is state-owned or tentatively conveyed, including 14 sections that encompass Chenik Lake and Chenik Head. These sections had previously been jointly selected by the state and Seldovia Native Corporation and were not subject to refuge authority until they became tentatively approved state lands. Litigation regarding these lands has been completed, and the State identified as the legal owner. The State will take ownership from BLM after any and all encumbrances to these lands have been addressed. A long-standing issue regarding commercial use of a site at Chenik Head for private commercial purposes was addressed by BLM and state agencies for resolution.

This issue involved a private commercial operator attempting to obtain a lease for approximately 10 acres of land in the Chenik Head area. This site contained several buildings that had served as headquarters for a private bear watching/wilderness retreat enterprise. Previous comments from Department of Fish and Game regional staff had recommended that BLM deny the lease application. However, DNR published a public notice requesting comments on the proposal to issue a letter of concurrence to BLM to issue the lease.

Response to that public notice was significant, and included comments from environmental organizations, fishing groups, members of the public and state legislature. Department staff sent additional comments to DNR recommending denial of the lease. DNR developed the State position and notified BLM of a final determination of nonoccurrence. In October 1999, BLM corresponded with DNR Commissioner Shively acknowledging receipt of their letter of nonoccurrence regarding the Chenik property. Subsequent correspondence between BLM and the Chenik operators resulted in agreements to cease operations no later than October 1999, and removal of improvements and rehabilitation of the site no later than September 30, 2000. As of this writing, the commercial facilities have not been removed and the operator has filed an appeal with the BLM.

Regulatory Changes and Management Plan

The Department of Fish and Game formed an internal task force in January 1998 to consider improvements to the McNeil River State Game Sanctuary permit system. The charge of the Task Force was to review and evaluate the operation and effects of the current permit system, identify elements that influence public participation and, with public involvement, develop and present regulation proposals to the BOG for any recognized changes.

At the March 1999 meeting, the BOG passed proposals resulting in regulation changes that became effective for the 2000 season. These changes included reducing the 4 year interval between visits to every

other year; reducing the number of standby permits from five to three; and modifying the 65/35 Alaskan residency preference rule to a goal rather than a requirement.

The Commissioner of Fish and Game also acted on task force recommendations and established commercial use permits with a fee structure contingent on statute changes, and increased application and permit fees. For the 2000 season, non-refundable application fees were increased from $20 to $25, resident permit use fees were increased from $100 to $150, non-resident permit use fees from $250 to $350, resident standby permit fees from $50 to $75 and non-resident standby permit fees from $125 to $175. A Scientific-Educational application fee of $50 was established and also a use fee of $150 and $350 for residents and non-residents respectively.

New Staff

The 2000 field season was the first summer at the sanctuary for two new employees. Tom Griffin replaced Derek Stonorov as the WT III and Samantha Wilson, a UAF student, replaced the student intern Brad Josephs. In June, significant effort was spent training both new staff members who quickly learned the skills necessary to independently lead groups of bear watchers. Both staff members did an excellent job, and Tom Griffin has indicated he will return in 2001 and Samantha Wilson, if accepted into graduate school, will return as well.

Public Use

A permit is required for access to the sanctuary from June 7 through August 25. A system in place since 1993 has required that both regular and standby permits be issued through a lottery process. This system was established to reduce staff time required to manage the previous standby system and to reduce the potential for members of the public to receive more than one permit per year. For the 2000 season, the BOG reduced the number of standby permits from five to three.

The number of people taken to a bear viewing area is limited to ten per day. In 2000, from June 7 to August 25, an average of 7.8 people per day visited bear viewing areas in the sanctuary (Table 1). This is a slight increase from the 1999 average of 7.4 people per day, however remains below the long-term average visitation. A total of 198 persons visited the sanctuary in 2000; a decline from the 1999 season (Table 2).

In 2000, ADF&G received 1,322 applications for the 242 available permits (185 regular and 57 standby); a small increase from 1999. The record high number of 2,150 permit applications occurred in 1993 (Table 2). The 1995-1999 average number of applications was 1,369. Application numbers have fluctuated considerably, especially after a media presentation on the sanctuary. The previous declining trend in applications may have represented a response to a regulation passed by the Board in 1993, which established a 4 year waiting period for successful permit winners. This regulation may have prevented some applicants from applying on a more frequent basis resulting in declining numbers of applications, and subsequently, program revenues. Although only one year of information is available, it appears that the elimination of this regulation by the Board in March 1999 may have resulted in a change to the declining trend.

A sanctuary goal is to maximize the number of bear viewers within the required permit guidelines. All time slots are not always filled despite use of standby permits, primarily because occasional periods of stormy weather prevent airplane transportation, and the poor weather reduces visitors' enthusiasm to view bears. Bear viewing is also less reliable at both ends of the season, and some vacancies occur as people cancel their visits to the sanctuary. Additionally, as a result of changes in funding and personnel rules, staff were not available to accompany late arriving visitors to the viewing areas. If visitors arrived on airplanes after the viewing group had left for the day, they were not allowed to visit a viewing area. This contributed to the reduction in average number of visitors/day for the sanctuary.

All fifteen special permits were issued for the 2000 season. The demand for special permits continues to be high and the department receives numerous requests each year. Criteria developed by the department for issuing these permits provides consistency during the review of future proposals.

Brown Bear Status

In previous years, sanctuary staff observed and recorded the number of individual bears in the sanctuary and compiled information regarding total bears seen and total bear use days. Identification of individual animals was confirmed by simultaneous sightings of that animal by two or more staff. In 1999, new staffing schedules were implemented because of administrative requirements that eliminated multiple staff at the viewing areas. Identification of individual animals is not possible without discussion between staff and verification of that identification at the viewing areas. Therefore, individual bear use information is no longer available. Bear use information will be gathered and tracked using the statistical technique of maximum counts developed by department staff.

Maximum Counts

In early 1993, during development of the McNeil River State Game Sanctuary and Refuge Operational Management Plan, the public advisory group determined that a consistent, reliable method of determining fluctuations in bear numbers was needed. To address that concern, a "bear threshold criterion" was established and identified as a predetermined level of change in the population that would trigger an assessment of potential factors that may be adversely affecting the bear population or the sanctuary viewing program. The necessary statistical test, developed by division statistical staff, is based on the proven Shewhart-CUSUM quality control test. The test will detect large, short-term declines and gradual, long-term drift in the average number of bears.

Maximum daily counts, consistently collected at McNeil Falls from 1983 to 1992, were averaged to establish a standard of 48.6 bears as the benchmark for maintaining bear numbers and viewing opportunity. The median maximum count will be compared annually with the predetermined lower level of change to determine whether the number of bears observed is within the range of normal fluctuations. If the median annual maximum count drops below the threshold level of 40.8 bears, an investigation of probable causes will be initiated.

Because of the recent significant staff turnover and concerns about data consistency, it was determined that maximum daily count data for the 2000 season could not be compared to historical data collected by experienced observers. Department statistical staff determined that highest hourly counts, i.e. maximum counts of visible bears taken on the hour, closely follow the maximum daily count data (Figure 1). Therefore, it was determined that the maximum hourly count data would be used in the Shewhart-CUSUM analysis to determine trends. Statistical staff believe this analysis, although not a "statistical fact", is adequate for trend review.

The 2000 mean value for the 7 highest hourly counts was 35.7 bears. This figure is below the minimum level of bear use at the falls established as the standard, and indicates a declining trend in use. However, staff believes that low bear use levels in 2000 are associated with the long-term failure to meet chum salmon escapement returns to the sanctuary. Additionally, other factors such as larger sockeye salmon returns to Bristol Bay drainages may be contributing to the decline by attracting bears away from McNeil. Some spawning areas in these drainages are only about 30 miles from the sanctuary and easily available to the bear population.. Table 3 provides a summary of the hourly count information, and Appendix 1 provides information on the statistical analysis.

Brown Bear Hunting

The sanctuary is closed to brown bear hunting by statute. In October 1995, the Board of Game closed the refuge to brown bear hunting, effective 1 July 1996. However, areas surrounding the sanctuary and refuge are still open to brown bear hunting and may be a contributing factor in the observed decrease in bear use during the 2000 season.

Brown bear hunting seasons took place in fall 1999 and spring of 2000 in GMU subunits 9A, 9B and 9C. These subunits are adjacent to the sanctuary/refuge. Both the fall and spring seasons in GMU subunit 9A (Cook Inlet side of Unit 9) were record harvests, with the fall harvest the highest since 1961. Twenty seven bears were harvested in subunit 9A in fall 1999. Preliminary harvest figures indicate that 35 bears were

harvested in subunit 9A in spring 2000. The record fall brown bear harvest in GMU subunit 9B (Lake Iliama drainages) was a total of 90 bears, compared to the previous high harvest of 41 bears. The 10 year average annual 9B fall harvest (from 1981-1998) was 21.2 bears. The second highest recorded spring harvest was observed in GMU subunit 9B, with a preliminary harvest of 19 bears. Subunit 9C had a fall 1999 harvest of 32 bears and a preliminary spring 2000 harvest of only 3 bears.

Commercial Fisheries

Division of Commercial Fisheries staff in Homer developed the narrative on commercial fisheries activity. The cumulative Mikfik sockeye salmon escapement index was 10,910, while the McNeil chum escapement was estimated at 18,600 (Table 4). There was no commercial fishing effort targeting sockeyes in McNeil Subdistrict this season, and the subdistrict was closed for the duration of the chum return. As a result, no harvest occurred, and those entire returns entered the respective drainages to spawn.

This season marked the twelfth straight year that the McNeil River chum salmon run has failed to produce a significant commercial harvest, while the escapement failed to reach the lower end of the escapement goal range (20,000 - 40,000 fish) for the eighth time in the past eleven seasons. This contrasted sharply with the nearby Big and Little Kamishak Rivers, where chum salmon returns were the strongest in over a decade, as well as more northerly systems between Bruin Bay and the northern limits of the district, where virtually all chum goals were achieved. Also for the first time in many seasons, significant effort directed at chum salmon occurred in Kamishak Bay District, specifically in the Kamishak and Douglas River Subdistricts, with a resultant harvest of approximately 67,000 fish, the highest since 1988.

The number of spawning chum salmon observed upstream of the McNeil River falls this season was once again disappointing, with a peak count of 590 fish made on July 12. Two other surveys this season detected fish above the falls, albeit in relatively small numbers.

Post-season evaluation indicates that run timing was normal for both the Mikfik sockeye and McNeil chum returns, and the three different methods used to derive the total McNeil chum escapement index yielded mixed results: 1) the historic mean run timing curve, used to extrapolate the "tail" of the run after the August 7 survey, produced a cumulative total of 24,440; 2) the preferred method (calculates area under the curve assuming a 17.5-day stream life factor), now used to estimate escapements for most other streams in LCI, resulted in a cumulative estimate of 18,607 chums; 3) simple accumulation of counts from each survey after the first observed peak on 7/7 produced a total of 29,240. The second method has been adopted as the standard methodology for generating escapement indices and is considered the most precise estimate of escapement. Another method for estimating escapements, using a video camera and video cassette recorder (VCR; see below), was also used again at Mikfik Creek/Lake this season, but tapes have not yet been reviewed for enumeration and therefore escapement figures from this method are currently not available.

Mikfik Creek Video Research

Deployment of the remote video escapement recorder (RVER) at the outlet of Mikfik Lake occurred for the third consecutive season. Continuation of this project is expected to demonstrate that remote video and time-lapse recording technology is capable of producing salmon escapement estimates similar in accuracy to weirs, which are presently considered the most accurate escapement-monitoring tool available. As the program is refined and continues to mature, remote video may be able to supplant aerial surveys as a means for collecting escapement data on small clear streams that don't warrant the expense of weirs or sonar.

The RVER system at Mikfik Creek once again consisted of a remote camera suspended directly above the stream pointing downwards at an angle, with its field of view encompassing the entire width of the stream. Images of fish swimming past the site were recorded onto a time-lapse VCR. By programming the VCR to capture a single frame every 1.5 seconds, a standard 160-minute VHS tape could theoretically last up to 12 days. The entire system was powered by four 12-volt batteries, which in turn were kept charged by the combination of a wind generator and a solar panel. Tapes were periodically retrieved during routine aerial survey flights. As time permits this winter, the tapes will be played at high speed on a standard TV monitor to determine periods of high fish passage, then will be reviewed in more detail to estimate escapement.

With experience gained from the previous two seasons, small but significant modifications to the RVER configuration continued this year. The substrate panel was moved approximately three meters upstream from its previous location in an attempt to alleviate the problem of simultaneous upstream/downstream fish migration across the camera's field of vision (fish trading back and forth prior to entering the lake). Indeed, with the substrate panel located on the "doorstep" of the lake this season, the new arrangement was considered successful, as fish recorded on tape no longer "debated" the move into the lake. It is interesting to note that water levels, which frequently reach the "critically" low stage in this system, did not appear to pose a problem to fish passage this season. This factor may have also contributed to the steady fish movement across the camera's field of view into the lake.

Another improvement this season involved the use of a new, higher resolution black and white camera, aimed upstream at a different angle to account for the substrate panel's revised location. One feature of the new camera, the ability to zoom, allowed for a more efficient field of view, encompassing only the "business" at hand and eliminating superfluous images such as the stream banks and alders, thus appreciably increasing the image quality. The new camera angle also seemed to reduce the common problem of glare encountered during previous seasons.

Unlike past seasons, no system shutdowns due to equipment failure occurred during 2000. The wind generator, in conjunction with a re-oriented solar panel, allowed the system to function continuously for the entire season with all the original batteries in place.

Although the video data collected this season has been reviewed for image quality only, no escapement estimate has yet been generated. For this reason, and to remain consistent with the historical Mikfik database, aerial survey data was once again chosen to generate this season's spawning escapement index. The improvements to, and experience gained from, the video project this season demonstrated that this relatively new technology should provide more precise data in future years.

Sport Fishing
Limited sport fishing occurs in McNeil Lagoon and Chenik Creek but is incidental to bear viewing activities. The only sanctuary area where fishing is allowed that attracts significant sport fishing interest is the lower Kamishak River. Due to low sampling effort and questionnaire returns, the Division of Sport Fish's annual survey of sport anglers does not accurately portray angler effort on the Kamishak River.

To address this problem, the Department included an angler reporting requirement for lodges receiving special area operating permits for the Kamishak River portion of the sanctuary. Seven lodges operated in the area during July, August, and September. As of this date, only three of the lodges have completed their reporting requirements, and accurate harvest and use information is not available. The information will be reported to Division of Sport Fish when it becomes available.

Fisheries Enhancement
Fisheries enhancement continues to play a major role in Lower Cook Inlet (LCI) salmon production. Enhancement and rehabilitation projects have made substantial contributions to commercial fishing harvests in the Kamishak Bay District. However, sockeye salmon returns to the Paint River enhancement project in 2000 were again poor, with only 30 fish observed. No commercial harvest or cost recovery occurred. The run strength was obviously insufficient to warrant opening the ladder to fish passage for a ninth straight year.

The Paint River Lakes were first stocked with sockeye fry in 1986 in an effort to develop a new sockeye salmon return to the drainage, which is blocked to upstream salmon migration by a steep waterfall at tidewater. From 1991 to 1995, approximately 600,000-750,000 sockeye fry were stocked annually in the Paint River Lakes. Although construction of the Paint River fish ladder was completed in October 1991, the number of returning adults has only ranged from 200 to 800 fish. Consequently, the structure has never been opened to allow fish passage upstream through the ladder system.

Cook Inlet Aquaculture Association has not announced plans to resume stocking of the Paint River lake system.

Volunteers
The 2000 season marks the eighth year for the non-department volunteers work party program. This program has created an opportunity for volunteers to assist staff in preparing the camp and trails prior to arrival of the first permittees. This program continues to be a very successful cooperative venture

In 1998 and 1999 volunteers helped install 1,080 feet of boardwalk between the trailhead and McNeil Falls. With the help of more volunteers this year, sanctuary staff oversaw the installation of another 1,680 feet along the same trail. Twelve volunteers arrived at the sanctuary on May 31 and June 1, and accompanied by three ADFG staff, met a barge from Homer at high tide and unloaded approximately 10,000 lbs. of boardwalk materials. Over the next six days, the 15 volunteers and staff distributed 100% of the wood to its position on the trail and completed installation of about half that total. All but two of the volunteers then left, and the staff and remaining two volunteers installed the remaining portions of the boardwalk over the next three weeks. The project was completely finished by the target date of July 1.

Approximately 60% of the trail from the trailhead to McNeil Falls now has boardwalk. The boardwalk covers what formerly was the worst part of the trail, i.e., the most eroded, muddiest, and damaged sections. Staff do not foresee, at least in the immediate future, a need to place boardwalk on any of the remaining trail. Public response to the boardwalk was overwhelmingly positive.

Land Use Permitting
Seven permits were issued for the establishment of sport fishing guide camps on the Kamishak River within the sanctuary. These camps appear to be operating in a manner compatible with sanctuary guidelines. Reporting requirements regarding number of clients and total fish caught are typically late in arriving at the Anchorage regional office. Additional compliance monitoring of the camps and storage permits may be necessary in upcoming seasons.

Bear-Human Conflicts
There were no known adverse interactions between bears and people in the sanctuary or refuge during the 2000 field season.

Remote Camera Project
The 2000 season was the second year of a three-year project to send real-time images of bear activity at McNeil Falls back to the Pratt Museum in Homer. Similar to last year, there were few problems at the sanctuary with the cameras, solar panels or accommodating the project personnel as they came and went. In the two years of operation, the glass covering a solar panel was damaged and bears damaged the antenna system, but these problems were quickly fixed with very little disruption to either the broadcast or to the bears as the repairs were made.

Bear Use
From July 15 through August 5, bear use was monitored on the hour by counting the number of bears observed at McNeil Falls. This type of information has been recorded since 1993; however, bear use during 2000 season was the lowest recorded. For the first time in several years, staff did not observe more than 40 bears at once, much less the 50 or 60 as seen in previous years (Table 3). The all time record high for numbers of bears seen at the falls is 68.

In the absence of specific research designed to determine why there was less bear use, all staff can do is speculate on the problem. The most obvious probable cause is continued low chum-salmon escapements. Only once in the last decade has there been a large enough salmon escapement so that bears had all the salmon they desired. It has been observed at the sanctuary that low salmon runs in the short term can actually increase bear use. In low fish years, as the bears try to meet their nutritional requirements, they try harder to catch fish and end up staying longer. Eventually however, with long term fish shortages, established use patterns change and bears seek alternative salmon runs for a food source. Those changes in use patterns appeared to start in 1999 and continued in 2000.

The sex and age composition of bears using the falls has also changed dramatically in the last several years. As recently as 1993, the sex ratio at McNeil Falls in late July was close to 50% males and 50% females (including their cubs). During the 2000 season, the sex ratio was more than 90% males all season long. It appears that in times of prolonged salmon shortages, the most dominant bears take over the best fishing spots and preclude use by other bears. Normally, less dominant bears then fish downstream or pick up bear-killed, but not totally consumed salmon and scraps. For the past several years, every salmon caught is totally consumed, leaving no partial fish or scraps for less dominant bears downstream.

Bear Mortality
Throughout early June, a female with two yearlings was observed along Mikfik Creek. On June 12, she abandoned the cubs. This was an unusual event because the cubs were only yearlings and not two and a half years old which is the normal time for females to "kick their cubs out." On June 17, one of the cubs was found dead and partially scavenged by other bears above the upper falls on Mikfik Creek. It was in the creek below a 40-foot high cliff. Staff examined the carcass and discovered a compound fracture of the femur, superficial wounds and a hole in the skull consistent with that made by the tooth of another bear. From this evidence it was surmised that the cub ran into another bear on top of the cliff (a well-used bear trail) and in the confrontation was killed and thrown or fell from the cliff.

On August 2, a large male with a rear leg injury showed up at McNeil Falls. This bear was in obvious poor shape, emaciated and having great difficulty moving. It did not attempt to fish and seemed oblivious to other bears. On August 5, the carcass of this bear was observed in the water above McNeil Falls. Due to high water and our inability to cross McNeil River, staff were unable to examine the carcass until August 9. At that time, staff discovered what appeared to be a bullet wound on his rear left leg. Further examination of the carcass found no other obvious wounds, a total lack of body fat, empty stomach and intestines and some water in the lungs. The actual cause of death may been drowning brought about by its overall weak physical condition. The skull measured 29 ¼ inches before drying.

Incidental Animal Observations

Uncommon observations of a wolverine(s) were made twice on the McNeil gravel spit during the summer. In mid-summer, the carcass of a young male caribou washed down McNeil River and grounded in the cove. Five bears took turns consuming it over the next 12 hours, reducing it to a skeleton by the next morning.

Projects Completed

In addition to completing the boardwalk project mentioned earlier, several other camp projects were completed during the season. These included rebuilding the gas shed, building a new picnic table, replacing the roof on the tool shed, building a desk/storage unit in Samantha's room, constructing a bench in front of the Fish and Game cabin and building a new firewood bin to store dry wood. Staff re-located an outhouse, applied wood preservative on all the cabins and graveled all the trails. Additionally, we developed a new tent site (bringing the total to 14), rebuilt both cold holes, painted one floor, placed rocks in front of the camp as a tide water break, and built a rock path leading into camp. Much of this work was made possible because of leftover lumber from the trail boardwalk project.

Gravel Spit

Over the past several years, staff have observed considerable natural changes to the gravel spit that forms a barrier for the lagoon. The base has become narrower and shallower and has begun to curve toward camp and away from open water. Extra gravel has been deposited at the end of the spit away from the cabin, making it longer and wider. The spit formerly protected the entire McNeil cove from the effects of the open sea. This was especially important for the campground, because of its proximity to the water.

Our primary concern is that the spit will eventually break through at the base, leaving the camp exposed to the effects of the open waves at high tide. Erosion of the beach is a real possibility. Logistically it may then become difficult to greet the planes and the visitors. The area immediately in front of camp has silted in enough that virtually all incoming planes must beach out toward the end of the spit. Currently, it is still possible to walk out along the spit and meet the planes, then walk the people to camp. If the spit were permanently breached, getting visitors to camp would be impossible without a boat and even more difficult in rough water. It is increasingly more difficult to get gear, including firewood, to camp due to the silting in front of the camp.

Because of field staff concern over the changing gravel spit, staff obtained aerial views of McNeil cove for 1951, 1974, and 1982 (Figure 2,3,4). The spit configuration exhibiting characteristics most like the current one occurred in 1951. It is possible that the changes we are observing are the natural ebb and flow of the spit and it will soon stabilize and move back to a more favorable position for sanctuary operations.

Table 1
VISITOR USE AT MCNEIL RIVER STATE GAME SANCTUARY

	1993	1994	1995	1996	1997	1998	1999	2000[C]	8yr Average
June 7-august 25 (80 days)									
$\bar{x}$ permits used daily	9.0	8.4	8.7	9.3	9.0	9.2	7.4[B]	7.8[B]	8.6
% with regular permit	74	76	82	85	83	81	86	88	82
% with standby permit	26	24	18	15	17	19	14	12	18
$\bar{x}$ daily visitors in the sanctuary[A]	14.1	13.6	13.4	14.5	15	13.7	14.	13.1	13.9

[A]= Includes all visitors (those who flew out as well as those who stayed overnight)
[B]= 1999 & 2000 (unlike 1993-1998) use figures are lower due to lack of a second staff person to bring late arrivals to the viewing area.
[C]= The number of Standby Permits dropped from 5 to 3 per period (95 to 57 annually)

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Table 2
Visitor Use Of McNeil River State Game Sanctuary (MRSGS)

Year	Footnotes	Number of Applicants	Number of Visitors	Total User Days in Sanctuary	Total Permit days for July/Aug (560 possible)	Comments on Season Length
1984	A,F	992	159	574	377	6/5 - 8/27
1985	A	832	216	816	449	6/10 - 8/25
1986	A	806	255	967	430	6/9 - 8/25
1987	A,G	1,757	252	1,054	473	6/9 - 8/23
1988	A	1,094	304	1,328	498	6/1 - 8/29
1989	A	1,306	264	1,183	488	5/22 - 8/26
1990	A	1,481	299	1,435	524	6/8 - 8/25
1991	B,E	1,818	249	1,415	526	6/1 - 8/27
1992	C,E,H	1,672	245	1,210	478	6/1 - 8/25
1993	D	2,150	225	1,128	516	6/7 - 8/25
1994	D,I	1,766	228	1,086	484	6/7 - 8/25
1995	D	1,486	212	1,074	475	6/7 - 8/25
1996	D	1,502	219	1,158	494	6/7 - 8/25
1997	D	1,474	228	1,197	489	6/7 – 8/25
1998	D	1,159	219	1,096	504	6/7 – 8/25
1999	D,J	1,223	208	1,122	398	6/7 – 8/25
2000	D,J,K,L,M	1,322	198	1,051	424	6/7 – 8/25

Footnotes Table:
A = No limit on standby or camp numbers
B = 1st come, 1st served for standby w/no camp limit
C = 1st come, 1st served for standby w/camp limit of 15
D = All permits (regular & standby) by lottery including June
E = Unlimited permits prior to June 15 then 10/day
F = $5 application fee instituted in 1983
G = $10 application fee and $40 user fee instituted
H = $20 application fee and new user fees ($100 Resident/$250 Non-resident) instituted
I = Visitors to the sanctuary must wait four years to re-apply
J = Lower staffing levels prevented late or early arriving visitors from joining the group
K = $25 application fee and new use fees ($150 Resident/$350 Non-resident) instituted
L = Number of Standby permits drop from 5 to 3 per period (95 to 57 annually)
M = Visitors to the sanctuary must wait one year to re-apply

Table 3
Highest Hourly Counts Of Brown Bears
Seen At One Time At McNeil Falls (includes cubs)

	1993	1994	1995	1996	1997	1998	1999	2000	8 year average
	highest hourly count	highest hourly count	highest hourly count	highest hourly count	highest hourly count	highest hourly count	highest hourly count	highest hourly count	highest hourly count
15 July	-	-	-	38	40	47*	28	37*	38
16	-	-	-	46*	32	42	28	31	36
17	-	-	-	29	47	46	35	31	38
18	37*	30	29	44*	43	47*	26	32*	36
19	58*	50*	33*	54*	66*	57*	36	36*	49
20	55*	37*	40*	40*	52*	32	37*	23	40
21	46*	43*	28	47*	50*	10	35	28	36
22	54*	26	48*	49*	44	18	38*	37*	39
23	49*	43*	29	47*	63*	35	42*	36*	43
24	30	52	31	33	52*	43	32	36*	39
25	18	18	39*	40*	51*	46	29	36*	35
26	28	37*	30	31	54*	63*	35	32*	-39
27	34*	44*	39*	37	49	50*	31	23	38
28	24	33	28	33	27	51*	37*	23	32
28	28	32	12	21	30	48*	36	24	29
30	21	25	32*	29	27	39	41*	28	30
31	19	20	35*	26	15	34	42*	19	26
1 August	13	16	23	22	17	35	42*	15	23
2	7	16	16	18	24	31	29	20	20
3	-	-	-	18	21	23	27	25	23
4	-	-	-	11	11	12	16	14	13
5	-	-	-	10	-	18	23	4	14

Highest hourly count is the single highest count of the day taken on the hour
High daily count is a one time count of the highest number of bears taken when the most bears are present
- = counts were not made
* = 7 high daily counts for the season or 8 year average

Table 4. Aerial escapement estimates of sockeye and chum salmon in the Mikfik Creek and McNeil River drainages, 2000.

Survey Date	Mikfik Sockeyes	Estimated Cumulative[a]	McNeil Chums	Estimated Cumulative[a]
5/30	10	10		
6/2	410	410		
6/5	1,367	1,367		
6/9	10,680	10,680		
6/14	9,380	10,680		
6/21	10,910	10,910	100	
6/26	8,075	10,910	1,310	1,310
6/30	1,050	10,910	700	1,310
7/7	300	10,910	5,290	6,600
7/12	400	10,910	3,340	8,270
7/19			4,360	10,450
7/23			4,300	12,600
7/27			4,350	14,775
8/7			7,600	18,575
CUMULATIVE TOTAL		10,910		18,607[b]

[a] The cumulative estimate is not the sum of daily counts, but is adjusted for fish schooled in the lagoon that may have been observed in previous surveys; all individual daily estimates are unexpanded live counts and considered to be conservative.

[b] The cumulative total was derived by estimating area under the curve with 17.5-day stream life factor applied and compares favorably with the historical mean run timing curve for McNeil River chum salmon.

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

DEPARTMENT OF FISH AND GAME

DIVISION OF WILDLIFE CONSERVATION

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MEMORANDUM

TO: John Westlund
Wildlife Biologist III
Anchorage

FROM: Earl Becker
Biometrician III

DATE: Oct 4, 2000

SUBJECT: Analysis of McNeil falls bear viewing data (Version 2).

I graphed the hourly count data that Larry Aumiller and his staff collected this summer. Due to concerns about data consistency (large staff turnover), Larry felt that he and his staff could not collect comparable maximum daily bear counts. I agree with Larry, that it would be extremely difficult/impossible for a new staff to collect highest daily count data that would be comparable to the historical data, which was collected by very experienced observers. The 2000 data (37, 37, 36, 36, 36, 36, 32), comprised the 7 highest hourly counts taken per day, the mean value was 35.71 bears (SE = 0.213). The CUSUM procedure we are currently using is based on the median of the 7 highest daily counts, the 2 statistics are generally very close (5 out of 6 see figure 1). In the future we wish to construct a CUSUM procedure based on the mean of the 7 highest hourly counts taken per day.

In Figure 1, I graphed the medians of the 7 highest hourly (1 per day allowed) and 7 highest daily maximum counts. Examination of the graph suggests a significant decrease in bear viewing from the baseline data. I can not confirm this to be a "statistical fact", since the data can't be directly compared.

cc: Larry Aumiller
Don Spalinger
Jonne Slemons

Appendix 1

Figure 1. One-sided Shewhart Control Chart for the7 Highest Daily and Hourly Bear Counts at McNeil River Falls (α = 0.01).

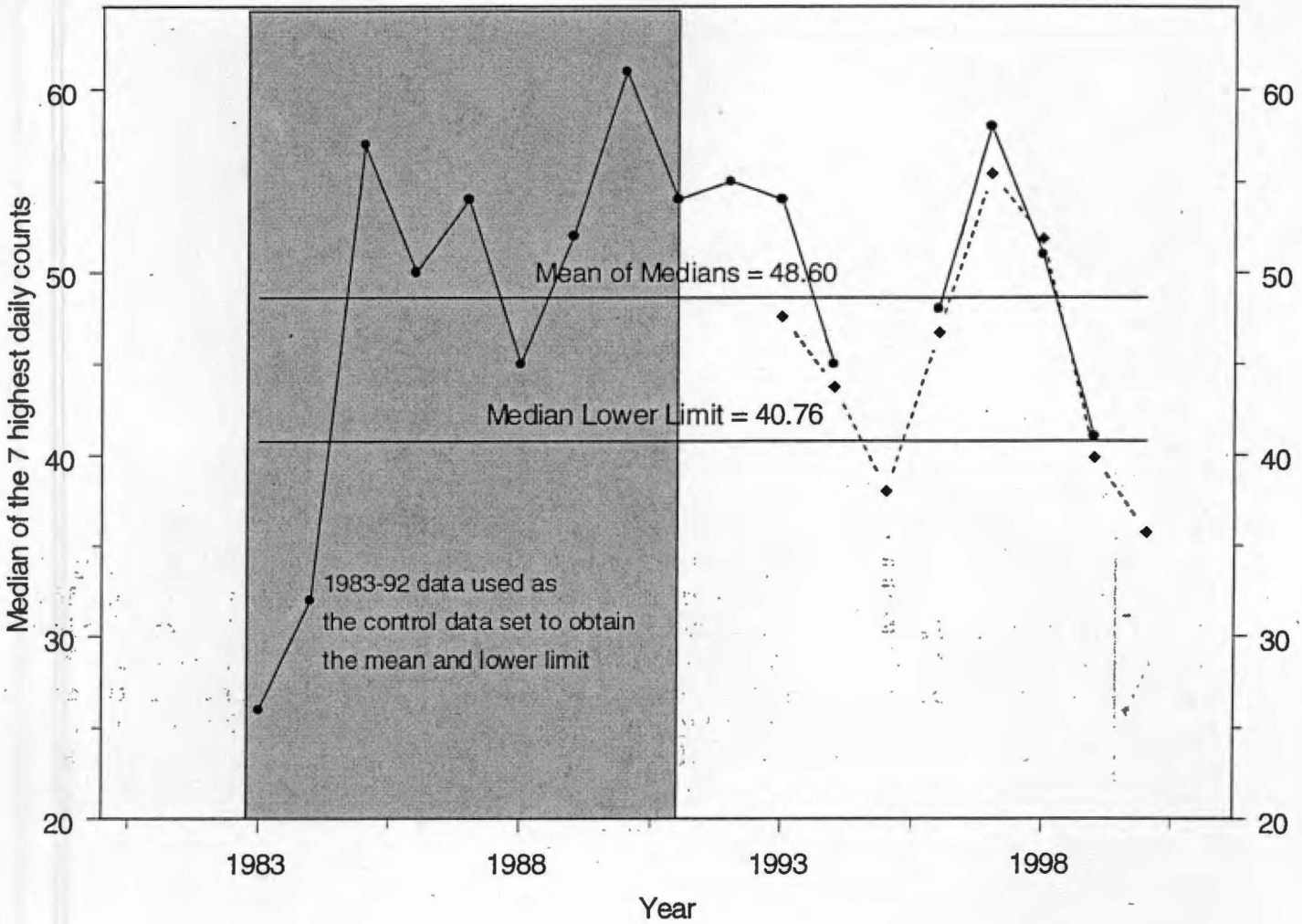

Figure1

Figure 2

Figure 3

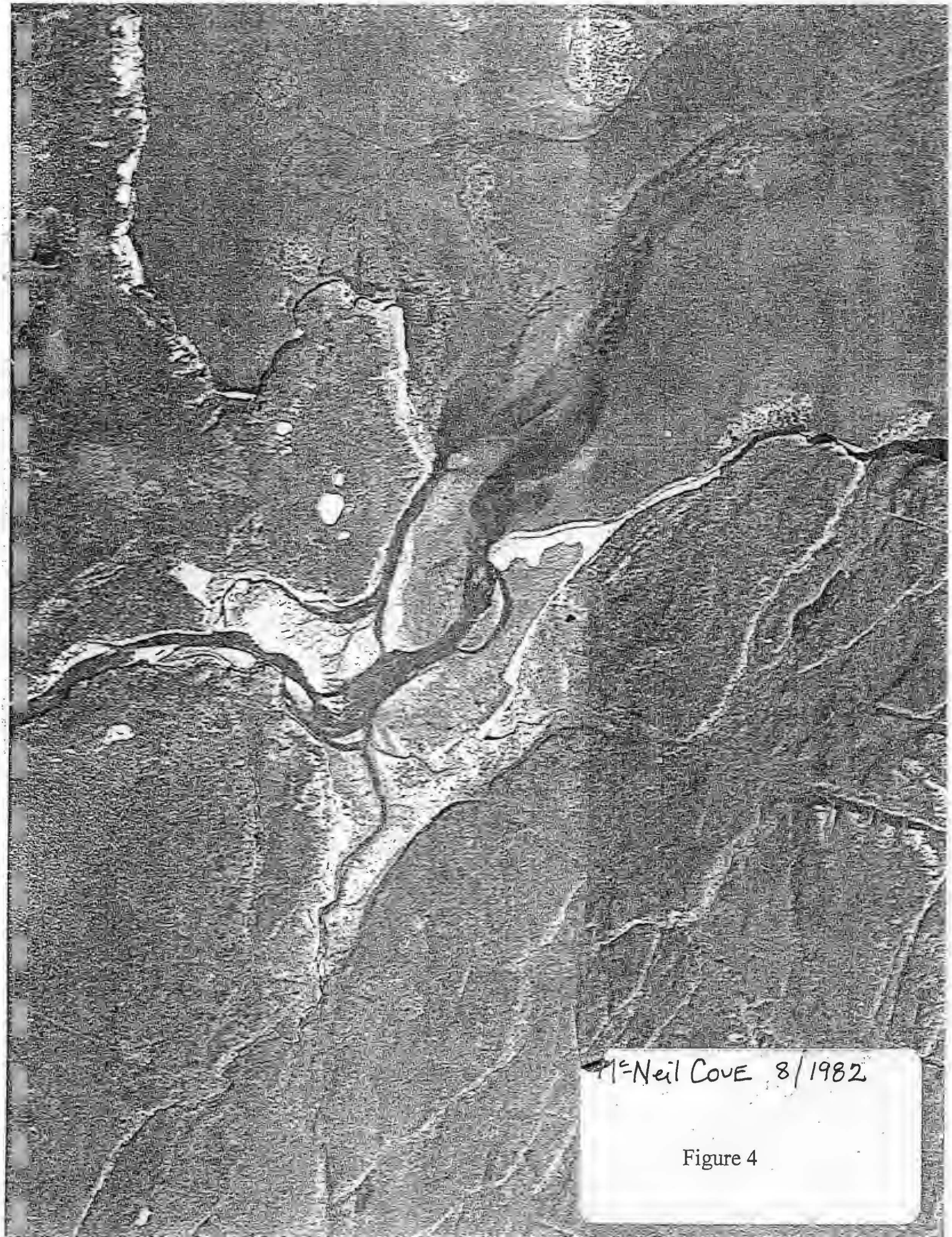

Figure 4

John Westlund

From: Lee Hammarstrom [lee_hammarstrom@fishgame.state.ak.us]
Sent: Tuesday, February 06, 2001 10:06 AM
To: Westlund, John
Cc: Brady, James; Brannian, Linda; Dickson, Mark; Otis, Ted
Subject: McNeil River Report

John:

I recently received a copy of the annual report to the legislature concerning McNeil River. I very much appreciate receiving it, but there are a couple of minor inaccuracies regarding the fisheries sections I'd like to point out.

Page 2 EXECUTIVE SUMMARY, last paragraph:

1) use of the word "dismal" might not be appropriate when describing this year's McNeil chum return since the estimated escapement of 18,600 was only 1,400 (7%) shy of the low end of the escapement goal.
2) statement that "the McNeil chum salmon escapement goal was not achieved for the twelfth straight year" is not true. The goal has not been achieved in 9 of the last 11 seasons.
3) statement that "there is no information available to determine if some of this chum harvest were fish destined for McNeil River" is not true. We sampled the commercial catch of chum salmon from the Kamishak River and Douglas River Subdistricts during the 2000 season. Age composition analysis from these samples matched the historical age structure of these stocks but did not match the historical age structure of McNeil River chum stocks, suggesting that the majority of the commercial catch was NOT comprised of McNeil River chums.

Page 8, FISHERIES ENHANCEMENT, second paragraph:

1) regarding Paint River, statement that "the number of returning adults has only ranged from 200 to 800 fish" is incorrect. The range of returning adult sockeyes has been from 30 (in 2000) to 1,870 (in 1998).

These comments may not be substantial but they certainly affect the overall accuracy of the report. I appreciate the fact that much of what is written regarding fisheries is lifted directly from text provided by CF. Perhaps in the future you could allow us the opportunity for a quick review of the fisheries sections prior to final submission of the report? Thanks.