No.	Date	Title of Study Consultant and Proponent	Principle Findings	Recommendations	Follow-up
1	2001	**Chilko River Watershed Communities** **Client Survey** Chilko Resorts and Community Association	**1) Source of Clients** • United States = 62% • Canada = 19% • Europe = 17% • Asia = 2% **2) Client satisfaction** • Very satisfied =88% • Satisfied = 12% • Neutral = 0% • Dissatisfied = 0% • Very dissatisfied = 0% **3) Importance of Wilderness and Scenery** • 1. Very Important = 98% • 2. = 2% • 3. = 0% • 4. = 0% • 5. Not important = 0% **4) Client's Primary Activity** • Fishing = 50% • Trail Riding = 31% • Relaxing = 18% • Hiking = 1% **5) Transportation Methods** • Airplane = 81% • Road = 19% **6) Guest's Season of Visit** • Summer = 84% • Fall = 12% • Spring = 4% • Winter = 0%		(planning)

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2	2001	**Habitat Use by Steelhead (Oncorhynchus mykiss) in the Chilcotin River Watershed, 1996-1999, and Implications for Population Monitoring** John Hagen. Prepared for BC Ministry of Environment, Lands, and Parks (Fisheries Branch) and the BC Conservation Foundation	Abstract: Radio telemetry investigations of the migrations of adult steelhead utilizing the Chilcotin River watershed for spawning were conducted during the 1996/1997, 1997/1998, and 1998/1999 escapement years. These surveys were part of a larger study investigating steelhead migration, stock composition, and population dynamics of the late summer/fall component of the Fraser River run. Steelhead radio-tagged in the lower Fraser River over this period either moved quickly through the Fraser to overwintering locations in the lower Chilcotin River (71%) or overwintered in the Fraser itself (21%). Upstream migrations from overwintering areas toward spawning locations were investigated during springtime, 1998, and springtime, 1999, and took place primarily from April until early June. Spawners appeared to reach the upstream extent of their migrations between early/mid-May and early June for both years, but aerial spawner enumeration, which took place on an approximately weekly basis during the principal spawners, suggested that the peaks of spawning activity were more than a week apart. Spawner distribution within the watershed, as determined from the springtime, 1998, and springtime, 1999, radio telemetry data sa well as radio telemetry done during the 1978/1979 and 1979/1980 escapement years, appeared to vary substantially from year to year.		
3	2000	**Region 5 Draft Profile: Cariboo. A Discussion Document.** Prepared for Ministry Of Fisheries by Alec McBeath	**Fishing and Angler Findings:** • non-Canadians Package expenditures seem to come to the region in higher numbers relative to the rest of the province • Package expenditures is a high value, which represents just under 30% of the package expenditures in the entire province (“packaged expenditures” refer to freshwater fishing packages purchased in British Columbia from a fishing lodge, guide or outfitter which includes a complete range of services such as lodging, food, transportation, etc.) • A total of 19,679 anglers who fished in the region stayed in fishing resorts or lodges. This represents close to 30% of the BC total in 1995 • Non _Canadians have been visiting the Cariboo for a longer period of time than most regions in the province		

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			• Non-Canadians give fishing in BC the highest rating		
4	2000	**A Community Report** By: Chilko Resort and Community Group	**1) The primary type of tourism business activity** • Accomodation = 61% • Activities = 19% • Retail/Restaurant = 10% • Transportation = 10% **2) Services offered by tourism facilities** • Accommodation • Food and Beverage • Equipment • Fuel • Repairs **3) Activities offered** • Backcountry tours, canoeing, ski touring, hunting, stationary tours, trap line tours, out post cabins, photo tours, fishing, rafting, hiking, biking, sea kayaking, mountain climbing, trail riding, snowmobiling 4) **Months of operation** • All year = 57% of operators • Nine months = > 50% of operators • June-August = all operators 5) **Visitor transport modes** • Private aircraft = 8% • Charter flight = 31% • Scheduled charter = 4% • Land vehicle = 57% 6) **Occupancy rates** • Summer = strong/full • Fall = strong • Winter = weak • Spring = weak 7) **Visitor motivation**	**Discussion:** • The industry is small but very mature • The industry is closely linked to the resource amenities which attract its clients • The remoteness is a key characteristic defining the quality and profitability of tourism product offerings	n/a

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			• Facilities • Activities • Wilderness/beauty • Drop-in 8) **Length of visitor stay** • 3 days or less = 40% • 4 – 7 days = 40% • 7+ days = 20% 9) **Product charge rates** • One day or less – average = $ 116.80 maximum = $ 220.00 minimum = $ 60.00 • More than one day – average = $ 194.77 maximum = $ 320.00 minimum = $ 60.00 10) **Tourism employment types and levels** • Full time year round = 41 employees • Full time seasonal = 131 employees • Part time year round = 15 employees • Part time seasonal = 83 employees 11) **Business expense types and location of expenditures** • Local to Williams Lake = 83% • Vancouver = 10% • Kamloops/Prince George = 4% • Other = 3%		
5	2000	**Preseason Run Size Forecasts For Fraser River Sockeye in 2000** DFO by Al Cass Ref: Cass, A. 2000. Preseason Run Size Forecasts For Fraser River Sockeye in 2000. Canadian	• Adult returns of sockeye to the Fraser River on the 2000 cycle line are the lowest of the four cycle lines av. 4.5 million sockeye compared to an all-year mean of 9.4 million during 1970-1999. The Chilko escapement expected for 2000 based on brood year escapement est. for 1996 is 974,000 spawners.	• Improvements to preseason abundance forecasts are unlikely without a better understanding of environmental factors affecting survival. The large differences between forecasts and observed returns in 1995 and 1999 coincide with intense El Ninos in sea entry years 1993 and 1997. At least during the recent period of intense El Nino	n/a

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		Stock Assessment Secretariat.Research Doc.2000/107 17 p.	• For Chilko sockeye the low survival in return years 1995 and 1999 is associated with intense El Nino events but overall there is no longer-term trend in survival patterns. (Fig.4) • The summer run of the Fraser R. sockeye returns account for 65% of the forecast, and within that timing group, the Chilko accounts for 33%.	events, the discrepancies between forecasts and run size is related to poor Fraser R sockeye ocean survival. The influence of the very intense 1997-98 El Nino on returns of age-4 sockeye in 2000 is unknown.	
6	2000	**Biological Responses of Sockeye Salmon to the fertilization of Chilko Lake, a Large Lake in the Interior of British Columbia.** M. Bradford, B. Pyper, K. Shortreed. Fisheries and Oceans Canada and Simon Fraser University. North American Journal of Fisheries Management. Vol.20, no.3, pp.661-671. Aug. 2000.	**Abstract:** We evaluated the response of sockeye salmon *(Oncorhynchus nerka)* to a five year experimental fertilization of Chilko Lake, a large oligotrophic lake of the Fraser River, British Columbia watershed. To evaluate the effects of nutrient addition on smolt production, smolt size, eand adult returns, we compared the data from the treated years to 39 years of pretreatment data for Chilko Lake, as well as data from seven other untreated sockeye salmon populations that served as controls. By using the other populations to control for variation in survival outside of Chilko Lake, we found that the mean productivity (recruits per spawner) of fertilized broods was 73% higher than unfertilized broods, but the uncertainty surrounding this estimate was substantial: 90% confidence interval of –2% to 174%. Total phosphorous, primary productivity, and to a lesser extent, zooplankton biomass were greater during the fertilized years. Nutrient additions increased the mean size of age-1 smolts by 34% and that of age-2 smolts by 58%. We found a weak positive relation between the size of age-1 smolts leaving Chilko Lake and their subsequent survival. Thus fertilization appeared to increase adult production by improving the survival of smolts in the ocean.		
7	2000	**A Bayesian Benefit-Cost Analysis of an Experimental Fertilization project for Sockeye Salmon *(Oncorhynchus nerka)* in Chilko Lake, British Columbia.** M. Maxwell. Simon Fraser University.	For Management Implications: • Bayesian statistics can be utilized to account for uncertainties in a sockeye stock recruitment relationship and in the effect of lake fertilization on this relationship. • There exists a strong probability that the Chilko Lake fertilization project resulted in a net economic benefit. • The Bayesian model cannot compensate for uninformative data. The outcome is only as good as the quality of the data input.	• The results are only applicable to this project and should not be generalized in any way. • Caution should be exercised in fertilization due to possible resultant ecological changes to aquatic and terrestrial ecosystems and the fact that enhancing one stock may have an indirect negative effect on other smaller, threatened stocks.	

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8	1999	**Using Photosynthetic Rates to Estimate the Juvenile Sockeye Rearing Capacity of British Columbia Lakes** K. Shortreed, J. Hume, J. Stockner. Fisheries and Oceans Canada	**Abstract:** We describe refinements to a simple sockeye salmon *(Oncorhynchus nerka)* rearing capacity model, the photosynthetic rate (PR) model, which was first described in an earlier paper. The model is based on a correlation between photosynthetic rate expressed as metric tons of carbon per year and sockeye salmon smolt biomass. Estimates of optimum escapements and spring fry recruitment required to produce maximum smolt numbers and biomass were taken from the Alaskan euphotic volume(EV) model. We define rearing capacity as the point at which the maximum number and biomass of smolts are produced and optimum escapement as the number of spawners that results in maximum smolt production. We compare model predictions to direct estimates of optimum escapements (developed from fry models-the relationship between the number of spawners and numbers of fall fry) from two British Columbia (B.C.) lakes (Babine and Chilko.author's note) and discuss assumptions and limitations of the model. Although we currently have direct estimates of optimum escapement (e.g. fry models) for only two lakes that make up 16% of the total B.C. sockeye salmon nursery lake area, PR data are currently available for 57% of B.C.'s nursery lake area. We provide estimates of optimum escapements and smolt production from those lakes where suitable data are available. By making assumptions about productivity of lakes where PR is unknown, we also provide estimates of optimum sockeye salmon escapement to all major regions of B.C. Although more research and data are needed, the PR model is a promising tool to help managers make decisions regarding sockeye salmon escapement and enhancement.		
9	1999	**Cariboo Region Freshwater Sports Fishing Facts** J. Willow and J. Griffiths BC Fisheries	• In total, sports anglers spent an estimated $53,416,128 from all categories of expenditures attributable to freshwater fishing in the Cariboo region in 1995 • This represents 11 % of total freshwater angler expenditures attributable to freshwater fishing in British Columbia in 1995 • The vast majority of anglers fishing in the Cariboo are British Columbians • Compared to BC generally, a lower effort by "Other Canadians", but a higher effort by "Non-Canadians" occurred in the Cariboo • 12% of all freshwater angling effort in BC in 1995		

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			occurred in the Cariboo • Compared to the sport fishing effort in stocked waters throughout BC, the Cariboo had a higher proportion (70%) of angler effort on stocked lakes • Over 16% of all days fished in BC on stocked lakes occurred in the Cariboo • 18% of all freshwater anglers who fished in BC in 1995 fished in the Cariboo • 74% of anglers from other parts of Canada who fished the Cariboo come from Alberta • 67% of non-Canadian anglers in the Cariboo come from the States of Washington and Oregon		
10	1998	**Southern Chilcotin Overview (1:50,000 Fish and Fish Habitat Inventory (Beece, Powell and Upper Big Creeks)** Brent Mossop. BC Environment-Fisheries Branch. Williams Lake.BC	**Water Quality:** water temperatures ranged from 6ºC on Beece Creek to 21º C on Hungry Valley Creek. Water temperature, pH, conductivity and turbidity are summarized in table #4. **Barriers to Fish Migration:** Five barriers to fish migration were noted during the project. The locations and physical characteristics of these barriers is summarized in table #3. **Habitat and Fish Distribution:** Fish were caught at all but 3 of the 17 sites. Site 10, the upper most site on Beece Creek and sites 11 and 12, the two sites on Powell creek. Bull trout *(Salvelinus confluentus)* were caught at 10 sites, rainbow trout *(Oncorhynchus mykiss)* at 7 sites and mountain whitefish *(Prosopium williamsoni)* at 3 sites.		N/a
11	1997	**Long-term Changes in Parasites of Sockeye Salmon (Oncorynchus nerka) Smolts** S. Bennett, M. Adamson, L. Margolis. University of British Columbia and Fisheries and Oceans Canada. Canadian Journal of Fisheries and Aquatic Sciences # 55 p. 977-986 (1998)	**Abstract:** Parasites were examined in 41 annual samples of sockeye salmon *(Oncorynchus nerka)* juveniles originating from lakes in British Columbia: **Chilko** and Shuswap. Nine species of parasitic helminthes and two species of parasitic Crustacea were recovered from various organs. The number of species ranged from three to nine per year. Most (94%) parasites belonged to three tapeworm species, identified as core to the parasite community because they also infected the most hosts. Two of these cestode species are probably maintained by resident freshwater hosts in the lakes. Positive numerical associations were observed between four parasite species pairs. Parasite communities in both lakes were composed of similar species, with the exception of three rare **Chilko Lake** species that were never recovered from Shuswap Lake. Parasites were often as variable within stock (temporally) as between stocks (geographically), except for the prevalence of		

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			Eubothrium sp. And *Neoechinorhynchus* sp. And mean annual intensity of *Proteocephalus* sp. and encysted digenetic metacercariae, which were greater at **Chilko Lake** than at Shuswap Lake. Discrimination between the two lakes based on their parasite community is possible only in extreme cases of infection and thus is of limited use to fisheries officers attempting to distinguish between these stocks.		
12	1997	**Estimation of the 1994 Chilko River and Chilko Lake System Sockeye Salmon (Oncorhynchus nerka) Escapement** N.D. Schubert and B.P. Fanos 1997 Canadian Manuscript Report of Fisheries and Aquatic Sciences 2428 54 p.	• In 1986, DFO assumed responsibility from the IPSFC for the est. of the escapement of Fraser R sockeye salmon (Oncorhynchus nerka) stocks. DFO adopted the IPFSC's two-tiered system whereby large escapements (25,000+) were estimated using enumeration fences or mark-recapture studies, and small escapements (< 25,000) were estimated using visual techniques. • The Chilko River system supports four sockeye salmon stocks which spawn in the Chilko and Taseko rivers and the north and south ends of Chilko lake; the escapement of these stocks exceeded 25,000 every tear since 1943. The 1994 study area included the populations in the Chilko River and the north and south ends of Chilko Lake. Sockeye were captured while migrating through the Chilko River at a site near the lower limit of spawning; 3,638 were released with disk tags. The spawning grounds were surveyed through the period of spawning and die-off; 102,030 carcasses were recovered, of which 819 had disk tags. The 1994 study area escapement was estimated , using the pooled Petersen estimator, at 187,684 adult males, 261,131 adult females and 1,477 jacks • The report identifies biases in the tag application and carcass recovery samples and discusses their potential impact on the population estimates. It concludes with recommendations for the improvement of study design , including improved allocation of sampling effort , resurvey procedures, the assessment of disk tag lossand handling stress, and the need to develop independent estimates of the river and lake populations.	• Changes recommended to improve the resurvey component of the study • Secondary tags or marks applied to sockeye released with disk tags to permit the assessment of disk tag loss. • Changes recommended to assess the role of stress and to remove the potentially confounding influence of stress effects from the evaluation of sampling selectivity. • Study design changes to assess the sampling selectivity issues. • The Chilko River and Lake sockeye populations are distinct and as a result the development of methods to provide independent estimates of the relative abundance of both should be established. • Spawners entering the spawning channel should be excluded from the channel until September 10th to permit lake sockeye to clear the river.	

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13	1997	**Chilcotin Overview Watershed Assessments-Priority Area No. 6** Klohn-Crippen for Tsilhqot'in National Government	**Lower Taseko River (Polygon No. 139a):** • Several cutblocks concentrated along an unnamed tributary located in the southeast area of the watershed with peak flow and riparian impacts • The number of roads as indicated by the 1995 forest cover data does not appear to be complete; several cutblock areas do not have road access.	• Review of more recent imagery and information; • FHAP, AMP, IWRP and TEM for entire watershed; • SSS for southeastern areas of watershed affected by logging activities.	
			Middle Taseko River (Polygon No. 139b): • Peak flows for SB 504 due to high density of roads and • High surface erosion potential for SB 505 due to proximity of roads to stream channels, the number of stream crossings and density	• Review of more recent imagery and information; • FHAP, AMP, IWRP and TEM for entire watershed; • SSS (for SB 504 and 505) **Special considerations**: • Additional assessments can be part of a larger assessment for the Haines Creek system which includes polygon Nos. 139a, 139b, 159, 169, 171, 171a, 177.	
			Upper Chilko River (Polygon No. 141d): • No significant impacts identified	• Review of more recent imagery and information; • TEM for entire watershed: and • FHAP for tributary streams of the Chilko River	
			Elkin Creek (Polygon No. 154): • No significant impacts identified	• Review of more recent imagery and information; • FHAP and TEM for entire watershed	
			Tete Angela Creek (Polygon No. 159) • Peak flows for SB 492 due to high density of roads; • High surface erosion potential for SB 492 due to the number of stream crossings and high road density; and • The number of roads as indicated by the 1995 forest cover data does not appear to be complete; several cutblock areas do not have road access.	• Review of more recent imagery and information; • AMP, IWRP and TEM for entire watershed; and • FHAP and SSS focusing on SBs 492 and 493 **Special Considerations**: • Additional assessments can be part of a larger assessment for the Haines Creek system which includes polygon Nos. 139a, 139b, 159, 169, 171, 171a, 177.	
			Tsuniah Lake (Polygon No. 160)	• Review of more recent imagery and	

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			• No significant impacts identified	information; • FHAP and TEM for entire watershed	
			Lingfield Creek (Polygon No. 163): • No significant impacts identified	• Review of more recent imagery and information; • FHAP and TEM for entire watershed	
			Nuntsi Creek (Polygon No. 167): • No significant impacts identified	• Review of more recent imagery and information; • TEM for entire watershed	
			Choelquoit Lake (Polygon No. 172) • Peak flows for SBs 541 and 542 due to high density of roads and • High surface erosion potential fopr SB 502 due to proximity of roads to stream channels, the number of stream crossings and road density.	• Review of more recent imagery and information; • FHAP, AMP, IWRP and TEM for entire watershed; and • SSS for SBs 541 and 542. **Special Considerations:** • Additional assessments could be combined with additional assessments for the neighboring Priority Area 5 watersheds.	
			Lower Chilko River (Polygon No. 177) • Several cutblocks concentrated along the eastern boundaries of SBs 452 and 453; • 1994 forest cover data does not appear to be complete; • several cutblock areas do not have road access.	• Review of more recent imagery and information; • FHAP, AMP, IWRP and TEM for entire watershed; and • SSS for southeastern area of watershed next to Haines Creek watershed (Polygon 171) **Special Considerations:** • Additional assessments can be part of a larger assessment for the Haines Creek system which includes Polygon Nos. 139a, 139b, 159, 169, 171, 171a and 177.	
14	1996	**Radio Telemetry Observations of Sockeye Salmon (Oncorhynchus nerka) Spawners in Chilko River and Chilko Lake: Investigation of the Role of Stress in a Mark-Recapture Study** N.D. Schubert and G.C. Scarborough 1996	**Background:** The study had three objectives: 1) To determine whether handling stress introduced bias in the annual mark-recapture study conducted on this population 2) Describe the fish movement patterns between the tagging site and the spawning grounds 3) Estimate the proportion of the stock which spawned in the south end of Chilko Lake	• The study should be repeated to confirm the results under different environmental conditions. • Each transmitter should be monitoring immediately after release. • The use of fixed wing aircraft is recommended. • Two additional stationary receivers should be located at Canoe and Stiklon Points • Sampling effort should be increased for lake spawners. • Transmitters on a given frequency should be	

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		Canadian Technical Report of Fisheries and Aquatic Sciences 2131 66 p.	**Findings:** • Fish in the early part of the study migrated very quickly through the river and into the south end of the lake • There were fish which migrated more slowly through the river to the narrows where they either remained for several days or moved back and forth between the upper river and north lake, then either moved back into the river or the north lake to spawn. Most of the river spawners dropped back into the river in two groups, on or about September 10th and 16th. After spawning, some then migrated into the lake and were not subsequently recorded • There was a group of slow moving late migrants which spawned in the river , often without ever reaching the Narrows. In all three groups, migration speed declined as the run progressed • The study estimated that 18% (35,900) of the adult males and 14% (47,500) of the adult females spawned in the south end of Chilko Lake. This estimate was unverifiable through direct observations. • Acute stress which may result from the handling associated with disk tag application was unlikely to have introduced bias into the mark-recapture population estimate.	synchronized to stagger their signals and multiple antennae should be used to reduce interference and noise blocking events. • Receiver range tests should be conducted each year.	
15	1996	**Bidwell Creek Watershed Channel, Fish Habitat, Road Condition, and Riparian/Wetland Assessments** By: Summit Environmental Consultants For: Chendi Enterprises Inc.	**1) Interior Watershed Assessment Procedure** • The Interior Watershed Assessment Procedure (IWAP) completed for Bidwell Creek generated four Hazard Indices; peak flow, surface erosion, riparian buffers, and landslides. Indices were greater than 0.5 (areas of concern) for the following: – Lower Bidwell Peak flow – North Bidwell Riparian Buffer – Upper Bidwell Peak flow and Riparian Buffer – These results indicated that a Level 2 channel		

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			assessment was required. **2) Channel Assessment Procedure** • The aerial photograph review of the watershed, which is the first phase of the Level 2 assessment, determined that two of the seven stream reaches analyzed had channel sensitivity ratings indicating moderate impact potential. The remainder had low impact potential ratings. No reaches had a rating of high impact potential. The reaches with the moderate rating, and thus requiring a field assessment, were Reaches #1 and #5 of the mainstem of Bidwell Creek. • The field assessments found few direct channel impacts due to forest harvest activities. No landslides were noted anywhere in the Bidwell Creek watershed. No evidence of channel movement was noted either on the aerial photographs or in the field. As well, there were no cases of excessive amounts of logging related large woody debris in the channel, and no sites with significant channel aggradation (a build-up of alluvial sediment due to increased sediment yield). A number of minor impacts were noted, that nevertheless could have at least local effects on water quality (see Table 5.4). All relate to active road crossings over the stream, and thus are likely the responsibility of the current licensee. • As indicated above, the Level 1 IWAP analysis indicated that changes in peak flow are a potential area of concern for the Lower Bidwell and Upper Bidwell sub-basins. Anecdotal evidence of increased water levels in the watershed has been provided from local residents. Increased water levels in the watershed are consistent with a large number of studies done on watersheds from around the world which show increases following forest harvest in both water yield (total volume of water flowing out of a watershed) and in peak flow. The threshold ECA for these changes to be detected is about 20%. Changes in peak flow do not appear to have had an impact on stream		

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			channel morphology or bank stability, but have reportedly impacted land use in the basin by raising the water table in a number of hay fields, thus reducing crop yields. These changes are a function of the watershed ECA, and are watershed scale phenomena. As such, the only mitigation is ECA reduction. Adherence to the *Forest Practices Code of B.C. Act* in any current or future forest harvest operation should be adequate to minimize future direct impacts on the stream channel network. **3) Fisheries Habitat Assessment** • A fisheries habitat assessment was completed in the Bidwell Creek watershed, with the field work coinciding with the channel and riparian/wetland assessment field work. In general, there is excellent habitat for both spawning and rearing resident fish in the Bidwell Creek watershed. Sampling identified two species of fish, Rainbow trout and White sucker. Very healthy populations were found in several locations. Overall there have been few direct impacts on fisheries habitat from forest harvest. Adequate riparian buffers have been retained in most locations, no cases of excessive large woody debris were identified, and there are few examples of sediment being directly introduced to the stream. Mitigation of the channel impacts summarized in Table 5.4 along with routine road maintenance should be adequate to minimize direct fisheries habitat impacts from forestry activities. • A major factor impacting fish habitat and water quality within the Bidwell Creek watershed is beaver activity. There has been extensive tree and shrub harvesting of the riparian zone for construction of dams and lodges and for food. The removal of this riparian vegetation has reduced stream cover and exposed much of the channel to direct sunlight. The large number of beaver dams are preventing resident fish from accessing areas of the stream channel with spawning size gravels and other areas with potential rearing habitat. **4) Water Quality Survey**		

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			• Overall, water quality in Bidwell Creek presents few constraints to aquatic life production in the system. Results of a water quality survey conducted September 22-23, 1995 indicate that the waters of Bidwell Creek are low in total nutrients, but have alkalinity, conductivity, and total dissolved solids concentrations that are somewhat on the high side of typical values obtained from a large number of natural streams and rivers. Dissolved oxygen levels were adequate for the protection of early life stage cold water biota at all but one site, although the below-criteria value may be attributed to the long holding time before analysis. • Forest harvest may have had an effect on water quality. Increased leaching of cations is a possible outcome of the reduction in evapotranspiration that follows forest harvest. Although no pre-harvest water quality data is available, residents along Bidwell Creek have reported a significant decrease in potability. **5) Level 1 Road Condition Assessment** • There are relatively few road-related drainage, erosion, or stability concerns in the Bidwell creek watershed. However, the level of deactivation and the adequacy of deactivation efforts within the watershed are inconsistent, and there is no evidence that any deactivation features are being maintained. There are several roads which require level 2 road assessments. Most of the observed problems present a low risk to soil and water resources, and the urgency of required rehabilitation work is considered high for only two roads: E3 and E6. **6) Riparian/Wetland Areas Impact Assessment and Biodiversity Concerns** • Roads intersecting riparian and wetland habitats are		

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			producing adverse impacts at nine locations in the Bidwell watershed. The impacts are of two types: (1) loss of cover, nesting/denning, roosting and feeding sites for many wildlife species, (2) increased hunting access and enhanced vision and clear shooting range. The second impact type is more significant. Increased access results initially in increased harvest and ultimately in avoidance response and reduced population levels. • Ground cover restoration work for erosion control and forage production is not warranted. Because of FEN and wildlife tree considerations, it is recommended that wetland/riparian corridors at the nine impact areas be considered for revegetation prescription work. This work should focus on creation of wildlife tree patches of local poplar trees and other desirable wildlife habitat enhancing species, especially forage shrubs. This prescription work could be tied in with road restoration project development. Restoration planting will not be required at all nine of the impact locations, and consultation and further field assessment is needed to determine needs and preferred techniques. • The other mitigation consideration, access management, is beyond the scope of this assessment but access and FEN planning for the Bidwell landscape unit can provide valuable input to site restoration planning. This assessment has established that local wildlife resource users have serious concerns regarding road access to the high value wetland/riparian habitat areas and current and potential adverse effects of over-hunting on biodiversity and harvest levels.		
16	1995	**Juvenile Sockeye Rearing Capacity of Three Lakes in the Fraser River System**	**Abstract:** We used three methods to estimate sockeye salmon *(Oncorhynchus nerka)* escapements that maximize production (Smax) in Fraser River lakes: *(i)* effective female spawners and		

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		J. Hume, K. Shortreed, K. Morton. Fisheries and Oceans Canada. Canadian Journal of Fisheries and Aquatic Sciences #53. p.719-733 (1996)	adult returns using Ricker stock-recruit analysis (SR models), *(ii)* effective female spawners and fall fry or smolts (fry models), and *(iii)* photosynthetic rates (PR model), a modification of and Alaskan sockeye production model (EV model). Adult SR models were not useful in predicting Smax because of high variability in Shuswap and **Chilko** Lakes (r^2<11%) and because of linearity in Quesnel Lake. Fry models using Ricker stock-recruit analysis provided Smax escapements of 0.90, 1.38, and 1.06 million for Quesnel, Shuswap, and **Chilko** lakes but were still highly variable Lakes (r^2<51%). Fry data indicated that fry numbers did not increase above escapements of 0.85, 1.5, and 0.51 million to Quesnel, Shuswap, and **Chilko** lakes. PR model predictions of Smax escapements to Quesnel, Shuswap, and **Chilko** lakes of 1.06, 1.85, and 0.62 were similar to escapements that first produced maximum observed fry numbers. While fry models provide a direct estimate of rearing capacity, many years of data are required to generate a relationship for any lake. The PR model appears to be a useful predictor of rearing capacity and predictions can be made after 1-2 years**. Note: Chilko bolded by this author**		
17	1994	**1994 Spawning Escapement Estimation Working Group Final Report** DFO Pacific Region Headquarters Library ref# QL 638 S2 F75 1994	• Sockeye spawn in the Chilko River immediately downstream of the lake, in a spawning channel in the Upper Chilko River, and on the shores along the north and south ends of the lake. They first arrive on the spawning groiunds in August Peak spawning normally occurs in late September, and the die off is complete by late October. • The enumeration study occurred from August 22 to October 22 in the upper Chilko River and Lake. • The 1994 Chilko River escapement (excluding the spawning channel) was approximately 447,397 +/- 10%.	• Field tests, by fences, lake population estimation studies, or other means, are recommended to test the assumption of stress related mortality and the behavioral impacts of tagging.	
18	1994	**Cariboo Chilcotin Land Use Plan** Commision on Resources and Environment. July 1994. ISBN 0-7726-2185-3	The Cariboo-Chilcotin Land Use Plan will be designated as a "higher level plan" under the Forest Practices Code of B.C. Act and therefore will guide the application of the Code in these zones. Through consultation and extensive technical analysis, the Implementation Team has established integrated land-based resource targets and strategies for timber, range/grazing, mining, fish, wildlife, biodiversity conservation, water management, tourism, recreation, agriculture/grazing, and wildcraft/agro-forestry in the	**A made in the Cariboo Land Use Plan that ensures:** • Access to resources • Sustainable resource utilization • Maintenance of environmental qualities and values • Integration of resource uses and values	Ongoing

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			three land-use zones.		
19	1993	**Consensus Report of the Chilko Lake Study Team** Facilitated by Gordon Erlandson. Transmitted to: Ministry of Energy, Mines and Petroleum Resources and Ministry of Environment, Lands and Parks.	**Summary:** The Chilko Lake Study Area is a relatively isolated and undeveloped part of the Chilcotin region of west central British Columbia, lying about 250 km north of Vancouver and 160 km west of Williams Lake. This area has been the focus of several land use studies since the early 1970s when the provincial government first considered its provincial park potential. A variety of users hold an interest in the area. The Nemiah Indian Band has declared the area an Aboriginal Wilderness Preserve to protect it and its peoples' lifestyle. BC Parks has long been interested in adding the area to the provincial parks system because of the recreational opportunities and ecological diversity. Mineral values are moderate to high, with good potential in some locales for economic return. Several tourism operators, guide outfitters, recreational guides and trappers currently make their living from Chilko's wilderness resources. Chilko Lake itself has the third largest sockeye escapement in the province, and the surrounding area supports significant wildlife values. There are also localized but important timber and forage values. Since the late 1970s, the area has been designated a Deferred Planning Area in recognition of the need to resolve competing land use interests. This status, combined with the recent provincial initiative for systemic planning for parks and wilderness areas, led to the establishment of the Chilko Lake Study Team in early 1991. The Chilko Lake Study Team first met in June 1991 with a mandate to: negotiate the resolution of land use issues among all affected interests; and make land use recommendations to the Ministers of Environment, Lands and Parks, and Energy, Mines and Petroleum Resources. A wide cross-section of interests is represented on the Team. The Team used a process of consensus, aided by an independent facilitator, to conduct all of its work. Information was collected, interest statements were presented and compared, competing interests were identified, and a set of agreements and conditions were negotiated and packaged. The Chilko Lake Study Team prepared a Draft Consensus Report for review by constituencies represented on the Team, as well as for broader public review. Using the advice received from this review, the Team developed its package of final recommendations for	**Land Use Recommendations: Zones 1 and 2:** A protected area of approximately 230,000 hectares is proposed for Chilko Lake, the Upper Tchaikazan Valley, and the Yohetta and Long valleys. It is referred to in the report as Zone 1. This proposed Chilko Lake protected Area contains important ecological systems, wildlife populations, and Aboriginal cultural sites and uses, notable recreational opportunities, special natural features and outstanding scenery. Important timber and mineral values also occur here. A matrix of permitted, restricted and excluded activities for the proposed protected area describes the specific management intent negotiated by Team Participants. It is an area where traditional activities can be supported while the integrity of the area's biodiversity and wilderness value is maintained. The roadless, remote character of the area should be linked with traditional activities and managed within a formal protected area designation. The Team has concluded that the most appropriate designation to recommend to government, based on the proposed intent and management regime, is a Class A provincial park.This designation is recommended subject to a memorandum of understanding between the Nemiah Valley Indian Band and BC Parks that describes the implications of park management on Aboriginal rights and interests. The Taseko Lakes area, Lower Lord and Tchaikazan River valleys and Gunn valley lie immediately to the east of the proposed protected area, but are distinct from it and are referred to as Zone 2: taseko Management Zone. Zone 2, an area of about 45,000 hectares, contains significant Aboriginal , ecological, aesthetic, recreational , wildlife, mineral and timber resource values, and serves as a transition between the proposed Chilko Lake Protected Area in Zone 1 and Provincial Forest lands to the east of Taseko Lakes. Zone 2 will accommodate a variety of activities associated with both extractive and non-extractive resource use.	partially

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			government.	These activities should be undertaken, however, with sensitivity to the values within the zone and in the adjacent proposed protected area. A matrix of activities describes where specific management guidelines are required. **Implementation Recommendations: Zones 1 and 2** Several elements related to implementation are key to the recommendations of the Study Team. 1. **Compensation** for displaced mineral tenure holders is recommended if a protected area is approved for Chilko Lake. To be able to support a protected area proposal, the Team agreed that negotiations should proceed immediately with affected mineral claim holders so that compensation can be paid as soon as any protected status is approved. Compensation negotiations between the provincial government and affected mineral tenure holders have begun and will proceed to a point where final ratification becomes automatic once protected area recommendations are accepted by government. 2. **Detailed planning** involving local residents and other affected interests is anticipated for both the proposed Chilko Lake Protected Area and the Taseko Mangement Zone. This planning will follow from the management guidelines and the activity matrix specifications proposed for each of these zones. Planning for Zones 1 and 2 should be done concurrently and begin no later than early 1994. Implementation of detailed plans should be scheduled for early 1995. 3. **A Local Advisory Group** will be established to work on detailed planning and implementation and will include representatives of local residents, the Nemiah Valley Indian Band, resource users, government agencies and other interested parties. This group will work by consensus and address all phases of planning and management. A mechanism for reolving disputes will be available to the group. **Management Recommendations: Zones 3-9** Adjacent to Zones 1 and 2, are a number of peripheral	

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				areas, Zones 3 through 9, which fall outside the primary area of study , but are important for achieving the interests that Study Team members brought to the process. While the Study Team has made specific recommendations for Zones 1 and 2, the nature of the discussions in Zones 3-9 were far less specific. The management objectives recommended for Zones 3-9 should provide a base from which future decisions for these areas can be made. The recommendations for Zones 3-9 recognize the existing activity sets within each zone and the need for decision-making processes to continue. Special issues or considerations for planning and management are noted and stated as recommended objectives for each of these zones.	
20	1992	**Acoustics and Freshwater Zooplankton** K. Morton and S. MacLellan Fisheries and Oceans Canada Journal of Plankton Research. Vol.14 no.8 pp.1117-1127, 1992.	**Abstract:** We investigated the potential of acoustic technology for estimating zooplankton distribution as part of an ongoing study of sockeye salmon *(Oncorhynchus nerka)* production in three lakes of the Fraser River system, British Columbia. Simultaneous acoustic and zooplankton samples were obtained in 1 and 2 m depth increments from the surface to 30 m at mid-lake stations. We derived a significant regression relationship ($r^2=0.71$, $n=79$) between zooplankton biomass ranging between 5 and 220 mg m-3 and acoustic backscatter *(V2).* The ensuing regression model was used to predict zooplankton biomass distribution from acoustic data collected along transects representing different lake areas.		
21	1988	**Fishing Lodges and Resorts in British Columbia Marketing and Development Initiatives** The DPA Group Inc. MacLaren Plansearch Corp. for the Ministry of Tourism, Recreation and Culture	**Key Findings – Cariboo** Regional Economic Impacts of the Fishing Lodge/Resort Industry in British Columbia, 1987 ($ Million) • Gross Revenues = 9.4 (BC total = 70.1) • Direct Value Added = 5.6 (BC total = 41.0) • Value Added = 7.0 (BC total = 89.0) • Total Impacts Wage Income = 4.5 (BC total = 56.6) • Employment (person years) = 200 (BC total = 2,560)	**Product Opportunities Freshwater:** • Sharper product focus on accessible fishing experience in a wilderness setting; remote fly-in fishing; high quality experience related to distinct species (steelhead) • Move product upscale consistent with user expectations and upgrade strategy for selected small to medium scale facilities) • High quality, fly-in facilities catering to specific geographic and activity markets • Joint ventures with Japanese, West Germans, Texans, etc. catering to the special needs of each geographic market • Fully guided operations on remote northern	

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				lakes owned and operated by native people (providing both sport fishing and exposure to native culture) Market Opportunities Freshwater: • Shift from regional to vertical marketing approach • Penetrate new geographic markets; U.S. Mid-West and South-West, European and Japanese markets through selected joint ventures (see above) • Promote to younger more affluent families (in concert with product upgrade strategy) • Greater focus on family and couples market • Collective marketing to the active elderly and recreational vehicle markets	
22	1988	**Gravel Permeability and Sockeye Incubation Success in the Chilko, Middle and Tachie Rivers** T.L. Slaney Aquatic Resources Ltd. Vancouver, BC 1988 DFO Pacific Region Library ref# SH 167 S6 S525 1988. 47 p.	• That gravel permeability and interstitial dissolved oxygen may be related to incubation success. • At the entrance to the Blue Pool area of the Chilko River, water depth precluded sampling or delineating substrate types in the heavily utilized sockeye spawning areas. In peripheral areas, permeabilities in the the Chilko system were generally higher than those of the Middle and Stuart systems although still well below those specified for spawning channels. • Comparisons between lightly and moderately utitlized sites in the Chilko River suggest that sockeye spawners were not selecting sites on the basis of substrate permeability. • There appeared to be no difference in spawning success between lightly and moderately utilized sites. • When moderately utilized sites were compared, it was apparent that the site having the lowest permeability and interstitial dissolved oxygen also had significantly lower survivals. • Comparisons between the marginal habitats sampled and established standards for spawning channels appear to be of little value. At all sites the sub gravel permeabilities and late winter dissolved		

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			oxygen levels were well below the accepted standards for spawning channels but incubation success in these areas appeared to be relatively high.		
23	1982	**Studies of Chinook Salmon (Oncorhynchus Tshawytscha) in the Chilcotin River Watershed 1975-1980** P.W. Delaney, A.L. Kahl, W.R. Olmstead, and B.C. Pearce. 1982 162 p. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1674	• From April 21 to June 5, 1978 a total of 257,969 underyearling chinook, 5 yearling chinook and 44 juvenile rainbow trout were captured by inclined plane trap in the Chilko river. From April 26 to May 28, 1979 a total of 588,528 underyearling chinook, 45 yearling chinook and 147 juvenile rainbow trout were captured by inclined plane trap in the Chilko river. • From April 22 to July 23, 1978, an estimated 234,300 underyearling chinook from the Chilko River were reared at the Chilko Lake outlet, with approximately 11,900 (6.0%) mortalities. The specific growth rate ranged from –0.04 on May 28 to 1.19 on June 11. • From April 26 to July 16, 1079, an estimated 228,700 chinook fry were reared at the Chilko Lake outlet, with approximately 4,900 (2.1%) mortalities. The specific growth rate ranged from –0.31 on May 5 to 0.90 on June 6. • In 1978 and 1979 respectively, an estimated 149,159 and 195,455 underyearling Chinook were released in the Chilko River with adipose fin clips and coded wire tags. • In 1978 and 1979, juvenile downstream migration trapping on the Chilko River indicated that Chinook fry migration began in late April, peaked in mid-May and terminated by early June. Extensive rearing, and probably overwintering occurred in side channels of the islands below Henry's Crossing. Light rearing and some overwintering occurred in the Chilko River mainstem and islands upstream from Henry's Crossing. • From 1975-1980, escapements ranged from 3,300-11,000 0n the Chilko River. Spawning commenced in early September. The major spawning occurred in the Lingfield Creek, canoe Crossing and downstream of Henry's Crossing areas. • From 1975 to 1980 the male/female percent sex ratio was 28.1/71.9%. In 1980 the fecundity of 1 female Chinook captured on the Chilko		

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			River was 5,900 eggs.		
24	1982	**Incubation, Early Rearing and Stocking of Chilcotin River Steelhead Trout: Progress 1981** C.R. Spence. Technical report F-82-5. BC Ministry of Environment Fish and Wildlife Branch-Fisheries Section	**Abstract:** During the summer of 1981, Chilcotin River steelhead fry were produced at a pilot hatchery facility using ground water from Hanceville Creek. The water supply temperature averaged 11º C and showed little variation. Wire mesh baskets and standard hatchery troughs were utilized for incubation and rearing. A total of 16,516 eggs were obtained for the project by electroshocking ripe donor stock from the Chilko River on may 22. hatching occurred on June 20 after 317 A.T.U.'s and mortalities totaled 4.3 %. Approximately 60% of all losses recorded during the project took place during the alevin stage. Swim-up was reached on July 6 at 493 A.T.U.'s and the survival was 85.5%.Fry attained a mean size of 1.0 g on August 14 after 40 days of feeding; survival from the green egg stage was 84.4%. On August 15, 13,871 fry were transported to the Chilko River and liberated.		
25	1979	**Background Information for the proposed Homathko-Chilko-Taseko Hydroelectric Development** T.R. Cleugh, C.C. Graham, S.Z. Robertson. 1979 DFO pacific Region Library ref # TD 195 E4 C442 1979. 51 p.	The BC Energy Board had proposed institution of the Taseko-Chilko-Tatlayoko diversion. This would consist of a diversion dam at the outlet of Taseko Lake, a series of canals and tunnels to Chilko Lake, and a tunnel from Chilko Lake to a powerhouse on the east shore of Tatlayoko Lake. • A dam at the outlet of Tatlayoko Lake would create a storage reservoir. • The Homathko River would be dammed at Nude Canyon 72 km upstream of Bute Inlet. • The Mosley Creek dam would be located on Mosley Creek, 13 km upstream of its confluence with the Homathko River.	• Additional lake surveys to be conducted on several smaller affected lakes to determine dissolved oxygen levels, temperatures, depths, species composition. • Additional stream surveys to determine major rearing and spawning areas, documentation of obstructions and determination of gradients, and determination of species composition by spot electrofishing where possible or by net angling. • Conduct steelhead surveys of the Taseko River by helicopter. • In the event that the alternative proposal was chosen (i.e. no diversion of Chilko Lake), determine the effect of the Taseko diversion on temperatures in the Taseko, Chilko and Chilcotin Rivers during the period of adult sockeye migration, and the necessary remedial measures. • Study the feasibility of providing facilities for passing adults and juveniles over taseko Dam, and providing replacement spawning grounds so	no

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				as to maintain the existing Taseko population. Study means of compensation for the loss of natural production from Taseko Lake.	
26	1977	**Investigation of the Prespawning Mortality of Sockeye in Chilko River in 1971** I.V. Williams. International Pacific Salmon Commission. Progress Report No. 35. 1977 DFO Pacific Region Library ref# SH 349 I5 P7 no. 35	• The early part of the sockeye run into the Chilko River has a higher incidence of prespawning mortality than the central or late segments. • The early fish tended to have higher hematocrits, high plasma cortisol levels, and their gill tissue was considered to be in poor condition compared with the other fish • The early run fish had the smallest eggs of the sampled fish. • Data suggests that some of the early fish had gill irritations which could lead to an upset in the physiology of the fish.	The data is inconclusive and further studies are recommended	partially
27	1977	**Investigation of the use of Antibiotics to Control The Prespawning Mortality of the 1971 Chilko Population** I.V. Williams and D. Stelter. International Pacific Salmon Commission. Progress Report No. 35. 1977 DFO Pacific Region Library ref# SH 349 I5 P7 no. 35	• Eighty-nine males and 118 females from the early part of the Chilko population were captured with a seine net approximately one-quarter mile downstream from the lake outlet. Fifty percent were classed as the north lake (early river) population, while 45% were classed as south lake population. • Fish were held in pens and treated with 50% penicillin-streptomycin and 50% oxytetraclcline. • The lake population of females was smaller than the river population and average fecundity for the lake population was 2,657 compared with 3,292 for the river fish. Similar results were found for the size of the males. • The data shows that the treated fish showed a greater rate of healing of gill irritation and fewer lesions at death. • The data also suggests that enhancement of the spawning success of river populations may be possible with administration of a combiotic. The obvious impracticality of this negates its application.		
28	1965	**Trout Fishing in Relation to Sockeye Salmon Runs in Major Fraser River Spawning Areas.** Author unknown. (Pacific	**Excerpt:** Sockeye migrate up the Chilcotin and Chilko Rivers, mainly in late August and school on the spawning grounds immediately below Chilko Lake. Spawning period is usually September 15 to 30 with some variation from year to year and with a few fish spawning just before or after this period. Trout are		

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		Salmon Commission, Vancouver)	attracted by the spawning but it is extremely difficult to angle among the spawning salmon. Better fishing conditions are found below the main sockeye spawning grounds which extend to "Canoe Cross", a wide part of the river 3 miles below the lake. Sockeye fry migrate along the river banks from the spawning grounds to the lake in May and early June. Fingerling sockeye leave the lake in late April and early May. Fingerlings attrack Dolly Varden trout and these are occasionally caught on spoons in the spawning ground area. Rainbow trout fishing is sometimes good in the spring, usually from late May to July, when the migrations of small sockeye are over.		
29	1964	**Limnological Survey of Chilko Lake 1964** J. Goodman. International Pacific Salmon Fisheries Commission	**Excerpt:** Summary: The limnological survey of Chilko lake during 1964 indicated an increase in zooplankton availability over all previous years. This increase was particularly true in the south end of the lake and may have occurred because of the lower than average turbidity in the region during the late summer of 1964. Water temperatures were below average during 1964, particularly early in the spring. Air temperatures were also somewhat below average throughout much of the growing season. Measurements of dissolved solids were similar to previous years. Limnology of Chilko Lake during the previous 1963 season has been re-examined in view of the extensive growth of juvenile sockeye during this period. The only evidence for this increased growth rate from limnological data suggests that although zooplankton abundance was average during 1963, the growing season may have been somewhat prolonged. Water temperatures remained warmer than usual in September, 1963 and air temperatures were above average throughout August, September and October. Air and water temperatures were also above average early in the 1963 season, but apparently remained cool enough in mid-summer so that extensive glacial run-off did not occur. Chilko Lake remained clearer than usual during the 1963 season, particularly in the north end of the lake where most of the small sockeye population was presumably located. It will be interesting to see whether the reduced turbidity and increased productivity noted during 1964 leads to a high growth rate of the resident sockeye population.		
30	1964	**Chilko River Kokanee Population, 1964**	During the 1964 sockeye dead recovery at Chilko River a total of approximately 50 dead kokanee were found. Thirty-five of these	It appears possible that these fish are residual sockeye rather than a self-perpetuating kokanee stock. It is	unknown

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		J. Goodman. BC Ministry of Environment Fish and Wildlife Branch	kokanee were preserved whole. This report presents a summary of the information obtained concerning this kokanee population. All kokanee spawners sampled at Chilko River in 1964 were males, as were the great majority obtained in all previous years. The 1964 run apparently was somewhat larger than in previous years and consisted of three age groups of the 1960, 1961, and 1962 broods. Growth of these fish was very similar to that of concurrent sockeye populations.	therefore recommended that the Chilko River spawning grounds be examined for additional lake-maturing members of the 1961-62 broods during 1965 and 1966. it is also suggested that sampling of the 1965 sockeye smolt migration be extensive enough for an accurate determination of the number or 1962 brood two year olds leaving the lake. Two year olds have formed at least 16-20 per cent of the smolt population produced by three previous broods (1950, 1954 and 1958) of this cycle.	
31	1962	**Growth and Feeding Habits of Sockeye Fry and Smolts from Stomachs of Dolly Varden, Chilko Lake** J. Goodman. International Pacific Salmon Fisheries Commission.	**Excerpt:** Sockeye fry captured from mid-June to the end of July, 1961, in the area north of 4 Mile Lake showed a progressive increase in the amount of food consumed as the season progressed. Although insects appeared in the stomachs of some fry, zooplankton was the predominant food item in over 80 percent of those sampled. Copepods were the most frequently identified zooplankters, with the cladoceran form “Bosmina” not appearing in any numbers until late July. In the Nemaia-Lagoon area, sockeye fry contained considerably more food than those sampled closer to the lake outlet. Insects appeared to form a slightly greater percentage of the food consumed. Feeding habits of sockeye smolts captured during April-July 1961, varied considerably by date and sampling area. Those captured in the river early in April contained little food and 37% of the stomachs examined were empty. During April, zooplankton was the predominant food item in the majority of stomachs (60-88 percent) and almost all plankters identified were copepods. Feeding increased as the season progressed and large volumes of insects were found in smolt stomachs sampled during May. During this period insects formed the predominant food item in 50-60 percent of the smolts captured in Chilko River, and in all those captured in the Chilko Lake. The few smolts captured during late June and July again contained predominantly zooplankton, suggesting that the large volume of insects consumed during May occurred during a fairly brief insect “hatch”.Bosmina were found in very few stomachs in April, but became more abundant later in the season. Comparison of the stomach contents of sockeye smolts sampled during June and July with fry captured during approximately the same period suggests that both generally utilized the same foods. Smolts appeared to feed somewhat more extensively on insects than		

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			did fry, and contained considerably more food than did fry in all but the Nemaia-Lagoon areas. Sockeye fingerlings sampled during August-October 1960 were found to feed more extensively on Bosmina and somewhat less on insects than did fry and smolts sampled in the spring and summer of 1961.		
32	1961	**Predator Investigation Chilko Area Spring, 1961 Summary of data Collected** J. Goodman. BC Ministry of Environment Fish and Wildlife Branch	During the spring sampling program (April 9-May 19) a total of 340 Dolly Varden, 103 Rainbow trout, 190 Whitefish, 67 suckers and 2 shiners were obtained from gill nets, beach seines and sports catch. Of these, 197 Dolly Varden and 46 rainbow were marked and released. Stomachs were preserved from 127 Dolly Varden, 44 Rainbow Trout, 37 Whitefish, 37 suckers, and 2 shiners. Preliminary examination of the stomach contents of these fish indicated that Dolly varden were feeding predominantly on sockeye migrants but that Rainbow, Whitefish and suckers were feeding entirely on insect larvae and bottom material.		
33	1960	**Summary of Data Collected Concerning Predatory Fish in the Chilko Area 1952-3 and 1957-9.** J.Goodman. International Pacific Salmon Fisheries Commission.	Gill-net and sports catch samples have indicated that both Rainbow Trout and Dolly varden Char are present in Chilko River close to the outlet of Chilko Lake. Both species were found to feed on young sockeye fry and smolts during their migration through this area. From stomach analysis, Dolly varden Char appeared to be the most serious predators on young sockeye at this period. However, condition coefficients of both trout and char tended to fluctuate in relation to variations in abundance of young sockeye. The close relationship between the number of fry entering the Chilko Lake in the spring and the condition of predators in the fall, may be an indication of considerable predation on young sockeye in the lake during the summer. Less predation on sockeye may occur during the winter (presumably due to lower metabolic rates), since there is no apparent relationship between the condition of predators and the number of smolts leaving the lake each spring.		
34	1949	**The Chilko River Watershed-Future of the Sockeye Salmon Fishery if the Power Development Takes Place. The Director's Report**	• In two consecutive years out of each four, the Chilko River originates between seventy and eighty percent of sockeye salmon from the entire Fraser River system. • Chilko River sockeye emerge for the gravel in the spring and swim upstream into the lake and rear for one year prior to migrating to the ocean for two years.		

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		B.M. Brennan. Director of the International Pacific Salmon Fisheries Commission	• As of 1949 the average value of the Chilko River catch for the previous ten years was $1,187,694. • The virgin remote Chilko spawning area was not known to require special study looking toward its protection and maintenance during power development until the summer of 1948. • The potential power was estimated on the basis of using the entire regulated flow for power. On this basis, the Chilko sockeye would face extinction. • It is estimated that 484 men would be employed in operating and maintaining the Chilko-Taseko hydroelectric plant. The number of men employed in fishing and canning of all species of salmon in areas adjacent to the Fraser River is approximately 8,750. • The Eutsuk-Whitesail-Kimsquit and Tahtsa-Kemano sites should be considered as alternates. No existing salmon spawning areas would be affected ; future fisheries development planned in the area would depend on the precise form of water diversion. • Successful maintenance of the Chilko-based sockeye fishery depends on retention of efficiency of function in three natural units. 1.) The migration route of the adult sockeye through the Fraser, Chilcotin, and Chilko Rivers must be kept passable. 2.) The productivity and size of the spawning grounds immediately below the outlet of Chilko lake must be unimpaired. 3.)Sockeye fry, which live in the Lake for one year or more after hatching, must have easy access to the Lake, and the Lake itself must be unharmed as a feeding and shelter area for the millions of young fish. • In plain words, and in view of all available information, the Chilko sockeye fishery requires all the water from Chilko Lake. • Damming and removal of the flow of Chilko and Taseko Lakes from the Fraser River drainage basin would have a negligible effect on flood control in the Fraser Valley. • If it is charged with a reasonable potential value of the Chilko fishery, its benefit-to-cost ratio is even more		

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			unfavorable. That is, the result to the region will be a net loss, if the Chilko power project destroys the Chilko fishery.		
35	1940	**Summary of the Sockeye Run to Chilko, 1940.** Observer's report-author unknown (Pacific Salmon Commission, Vancouver)	**Excerpt: "**It was found that this estimated total of 527,572 sockeye compares very favorably with the total run of 544,977 +/- 123,480 as calculated from the tagging experiment on the lower Chilcotin River. It should be pointed out, however, that this estimated total does not include the lake spawners while the calculated total does (a difference of 17,405 sockeye). With the large calculated standard error the two answers would be comparable even with a moderate lake population of sockeye." Extent of Spawning "During the season of 1940, the observable sockeye spawning area increased from two-thirds of a mile used in 1938 and 1939 to approximately two and a half miles in 1940. This was due, no doubt, to the large increases in the run which forced the spawners to use the portion of the river downstream from the main spawning area. It is of interest, however, to note that this is the first time that even the local Indians remember seeing sockeye spawning in this part of the river."		
36	1938	**Sockeye Run to the Chilco River-1938 Summary.** C.E. Atkinson. International Pacific Salmon Fisheries Commission (Pacific Salmon Commission, Vancouver)	**An excerpt: "**On September 1st the first sockeye were seen on the spawning beds in Chilco River. The run increased until September 10th when 1000 to 1500 sockeye were on the redds. Few sockeye arrived in the spawning area between September 10th and 15th but from the 15th to the 26th a large run passed through this area. On September 18th a patrol was made with Guardian Harvey and it was estimated that approximately 4000-6000 were present, the majority of the fish being in the upper spawning zone (Area 1A). Due to very poor conditions for observation, it was impossible to make an accurate count of the number of sockeye present. When the conditions were such that a count could be made, only 1500 sockeye were accounted for. It is believed that the run observed the previous week pass on into the lake to spawn. To verify this partially, two sockeye were taken dead in Chilco Lake and one sockeye was reported to be seen dead in Nemaia River, which, according to Harvey, is the first sockeye seen in this river for some forty years. It has also been reported that in some years dead salmon have been seen at the mouth of Gold Creek, at he head of Franklyn Arm and at the south end of Chilco Lake. There were		

No.	Date	Title of Study Consultant and Proponent	Principle Findings	Recommendations	Follow-up
			apparently few new arrivals to the spawning beds after September 26th. The numbers present decreased rapidly until October 25th (the last patrol made) when twenty-two sockeye were present on the redds."		
37	1925	**General Area Report on the Chilcotin District** C.W. Harrison, District Inspector of Hatcheries (Pacific Salmon Commission, Vancouver)	**An excerpt:** "This examination was made to determine the best methods to follow to increase the number of parent fish returning to the district by the assistance of modern cultural methods to natural propagation." "I may state that owing to its size and depth it would be impossible to plant any appreciable quantity of sockeye eggs in the Chilco River. Whereas, the salmon can spawn on the shelving line and also in other places in that river, operatives would not be able to handle the equipment used for the purpose of laying down salmon eggs now in use only at great danger to themselves."	**An excerpt:** "Therefore, it will readily be seen that rather than leave the boat at Chilco Lake where it will be of no use, this $200. boat could be placed on Quesnel Lake for approximately $80. and the other boat can be left at Chilco Lake for the use of the Fishery Guardian of that District." "I may state that in view of the adverse conditions prevailing in this district and having no means of communicating with you, I took the responsibility of bringing all egg planting equipment and surplus supplies out again to Williams Lake and transferred them to Quesnel to be used in Bowron Lake operation."	