



Friends of Ecological Reserves NEWSLETTER

Victoria, B.C.

November 1990



A Message from the Editor

Time to take pen in hand to support the preservation and good management of all those beautiful places we were lucky enough to enjoy in the summer. Time for increased action on the conservation front -- for instance, on Vancouver Island, for protection of the lower Tsitika and lower Tahsish valleys. Time to consider seriously slowing the loss of B.C.'s biodiversity.

The Friends have been active over the summer:

- Distributing our beautiful factsheet. We still have plenty of copies of **Ecological Reserves: Natural Areas for Tomorrow**. If you can take a bundle and distribute it around your community -- door to door, through an organization, in your post office, local library or office, please let us know.
- Funding research in the Megin River, in Checleset Bay, searching for Marbled murrelet nests. Reports from researchers are in this newsletter. It's already time to start considering funding proposals for 1991! Our mainstay is support for meaningful field work.

- Making submissions to the Old Growth Strategy Team. Much information about the Old Growth Strategy and some threatened areas has also been forthcoming from the government.

Also in this issue: an article on biodiversity by Dr. Jim Pojar, notice of fall and winter field trips and details of an exciting evening with Dr. Jim Darling that we are holding at the Newcombe Theatre.

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The Friends would like to offer our sincerest thanks to **Wilf Medd** for his time, effort and very competent work as our membership secretary. Wilf has served the Friends for five years, keeping very accurate lists and fulfilling many other duties. Thank you, Wilf!

Bob Fahrig has kindly agreed to take over the membership rolls.

Encourage your friends to join our small but active organization!

Trudy Chatwin

Marbled Murrelet Nest Discovered in the Walbran Valley

*When researcher **Irene Manley**, a biology senior at the University of Victoria (UVic), and **John Kelson**, an organizer and volunteer researcher with Western Canada Wilderness Committee (W.C.W.C.), discovered the first-ever Marbled murrelet nesting site in B.C. last summer, it was confirmation of the role of old-growth forests in the ecology of this threatened bird species. See the article The Mysterious Marbled Murrelet, in the July 1990 F.E.R. Newsletter.*

*The UVic project, funded in part by F.E.R., was headed by **Dr. Alan Burger**. A collated report follows.*

Alan Burger: Carmanah Valley is one of the last unlogged watersheds on Vancouver Island and has some of the largest trees in the Pacific Northwest. The lower half of the valley has been proclaimed a provincial park, but the upper half of the valley is in dispute and slated to be clearcut.

A team from the Biology Department at UVic, aided by volunteers from the Victoria Natural History Society and the Western Canada Wilderness Committee, worked in the valley through the summer. Irene Manley and Robyn Shortt were the principal field personnel.

Irene Manley: I undertook a study of Marbled murrelets when I realized that no intensive forest surveys for Marbled murrelet nesting sites had been done in B.C., and areas of old growth forest were being removed without considering old-growth-obligate species.

We had a lot of territory to cover, monitoring murrelet activity in different parts of the valley each day, surveying at dawn and dusk.

Early in the pre-dawn light of my first morning in the valley, a brown bird resembling a flying football flew up the creek past the W.C.W.C. Camp Hummingbird old-growth research station.

It was very exciting to see. The sighting verified their presence in the unprotected upper valley.

The best way to watch these fast fliers was to lie on my back beside the creek and look up through an opening in the forest canopy.



Things got really exciting late in June when murrelet activity increased to a frenzy. As many as 72 birds were sighted one morning at Camp Hummingbird, indicating that we were near a substantial nesting area.

Many were circling through the canopy, buzzing low through the forest and even landing in trees. John Kelson climbed these trees but found only fishy-smelling moss on some branches.

Burger: The frequencies of detections are among the highest recorded anywhere. Flight patterns suggested that the valley was used by both breeding adults (making direct flights at or below canopy level with no vocalizations) and prospecting birds (making high-level circling flights, punctuated by steep dives and flights through the canopy, and involving frequent vocalizations.) A platform erected in the crown of a very large Sitka spruce was used to record early morning flight activities. Quantitative data on the spatial and seasonal patterns of activities are being analysed.

Manley: Later in July murrelet activity began to drop, signalling the end of the breeding season. It seemed a good time to survey for Marbled murrelets in the neighbouring old growth left in the Walbran Valley. Clearcutting extends from the headwaters to the middle of this valley, where the valleybottom is dominated by spruce groves and braided networks of flowing and standing water.

On our first morning in the Walbran we watched a murrelet circle three times and then fly up into a 67-metre-high Sitka spruce. We observed the tree over the next two days but did not see any more activity. On August 3 John climbed the tree and, 40 metres up, saw something white, 3.4 metres out on a branch -- a Marbled murrelet nest, surrounded by a white ring of droppings, and well hidden by overhanging branches.

The area where we found the nest is literally on the edge of destruction. The tree is only ten metres from a logging road that is scheduled to be extended into more of the Walbran's spruce groves. Less than 300 metres up the road, a large clearcut is all that remains of hundreds of trees similar to the nest tree, prime murrelet habitat.

The B.C. Marbled murrelet population, believed to constitute 85 per cent of the species' occurrence south of Alaska, may be the only one that can be saved from extinction in the long run. In California, Oregon and Washington, little old-growth is left and populations are small and fragmented. The Marbled murrelet is vulnerable to

extirpation from loss of nesting habit due to logging, from oil spill- and gillnet fishing-induced mortality. In the long term B.C.'s Marbled murrelet population may be the only one that can be saved from extinction. The only certain way to protect Marbled murrelets is to set aside large tracts of old growth where they are known to occur. Remaining old growth in B.C. should be intensively surveyed for murrelet populations.

Burger: Funding and logistic support for the 1990 season were provided by the British Columbia Wildlife Branch, Friends of Ecological Reserves and W.C.W.C. Further research in Carmanah Valley and adjacent areas is planned for 1991.

Manley: It will be interesting to see whether the nest site is used again next year. Hopefully logging won't cause too much disturbance. The Carmanah and Walbran valleys would be ideal for studies in the many unknown aspects of Marbled murrelet biology. What better place for an ecological reserve than the site of Canada's first-located Marbled murrelet nest!

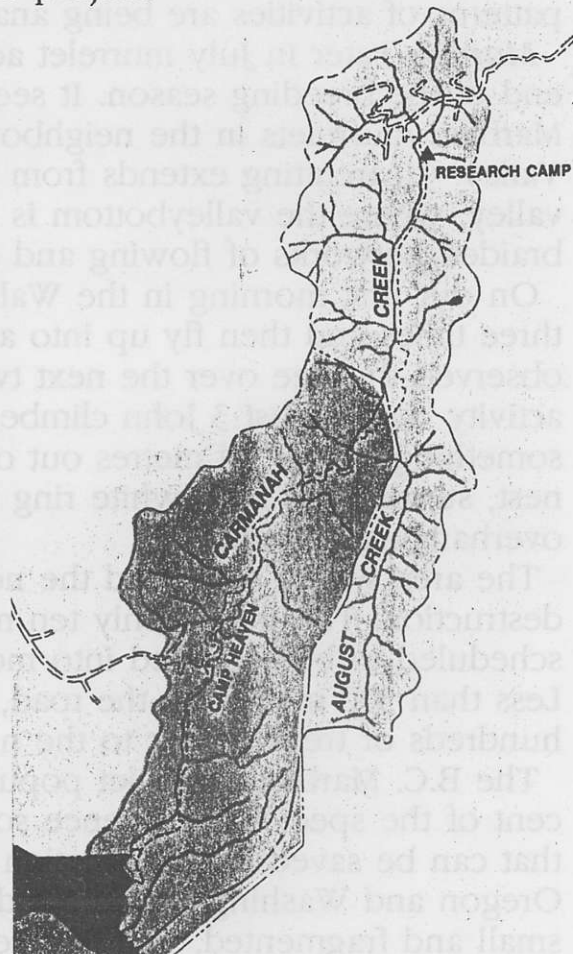
Many thanks to Friends of Ecological Reserves for supporting an underdog student like myself in this project.

Irene Manley says she is interested in surveying old growth forests in the Klaskish Valley and the Kitlope area, near Kitimat, for Marbled murrelets next year.

Meanwhile, two updates:

The B.C. and federal governments have established a Marbled murrelet recovery team to keep the species off the endangered list.

In October, during a week-end loggers were blockading access road to the Carmanah Valley, W.C.W.C.'s research station and much of the boardwalk to the upper valley were destroyed with chainsaws. RCMP have investigated the incident but to date made no arrests. A sawmill has donated cedar shakes to replace the boardwalk. "It's a stab in the back," says Irene Manley.



Upcoming Field Trips and Other Events



Clayoquot - On the Wild Side

7:30 p.m., Tuesday, November 13

Newcombe Theatre, Victoria

A multimedia slide show by **Adrian Dorst** and talk by **Cameron Young** will introduce their brand-new book. Tickets are \$5, available at the door or in advance at the Western Canada Wilderness Committee Victoria office, 102 - 19 Bastion Square. Call 388-9292 to reserve your tickets.

Gowland Range Hike

Sunday, November 18

The Gowland Range is part of the Highlands district near Victoria. Proposed for a regional park, the area is threatened by real estate development. Come for an easy hike, experience this beautiful, little-visited area and learn about the threat. Leaders **Patrick Pothier** and **Vicky Husband** will show us the trail up Jocelyn Hill. On most days there is a spectacular view across Finlayson Arm.

Bring lunch, fall clothing, suitable footwear and raingear.

Meet at 10 a.m. at the turn-around at the top of Millstream Road, past the Pike homestead and Lone Tree Hill Park.

Free for F.E.R. and Sierra Club members. Others: \$2.00.

Galiano Bog, Porlier Pass and the Pink Geranium

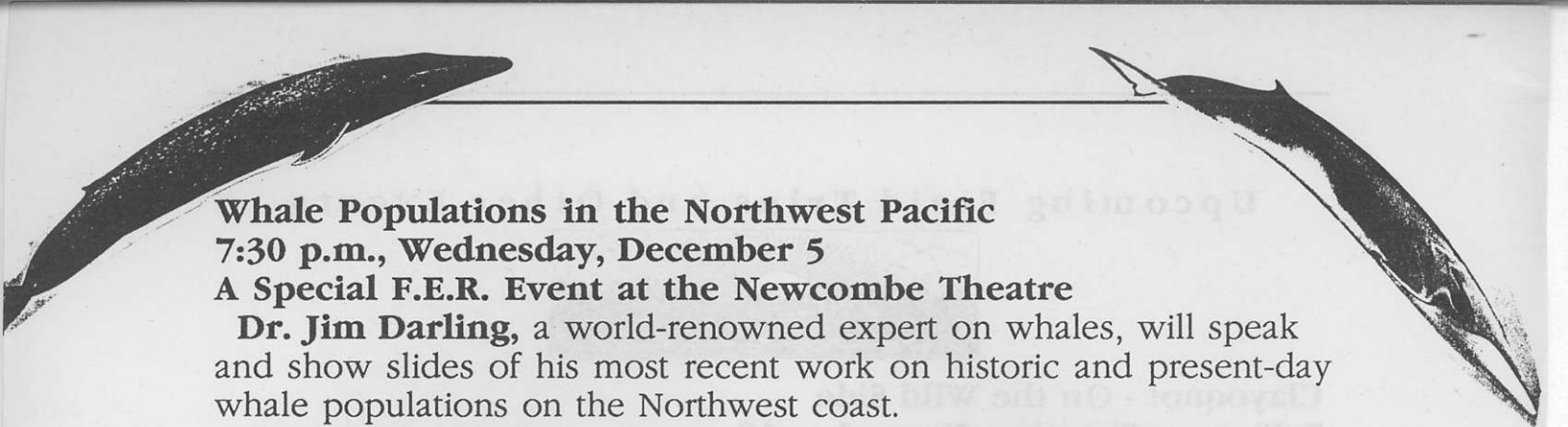
November 24 and 25

Our annual fall foray to Galiano Island. We will visit the newly created Galiano Bog Ecological Reserve, take a walk to the lighthouse at Porlier Pass, then have a sumptuous dinner at the renowned Pink Geranium restaurant. Time permitting, we may visit Bodega Ridge, a controversial area owned by MacMillan Bloedel Ltd.

Meet at the Sturdies Bay ferry dock on Galiano at noon on Saturday, Nov 24. Ferry times: from Swartz Bay to Sturdies Bay at 7:50 p.m. Friday or 9:40 a.m. Saturday. From Tsawwassen: 9:25 a.m. Saturday. Return to Victoria: 8:35 p.m. Saturday, 10:30 a.m. or 8:15 p.m. Sunday. To Tsawwassen: 5:50 p.m. Saturday, 12:30 and 8:50 p.m. Sunday.

Stay at Sutil Lodge Bed and Breakfast or camp in Montague Harbour on Friday and / or Saturday night. Dinner will cost approximately \$20. Transport costs (about \$10) will be shared.

Phone Henry Bauld at 721-5962 to reserve. Dinner seating is limited.



Whale Populations in the Northwest Pacific

7:30 p.m., Wednesday, December 5

A Special F.E.R. Event at the Newcombe Theatre

Dr. Jim Darling, a world-renowned expert on whales, will speak and show slides of his most recent work on historic and present-day whale populations on the Northwest coast.

During research for a December 1988 National Geographic article, Jim travelled to Sri Lanka, the Gulf of Mexico, the Gulf of St. Lawrence, Japan, Argentina and Alaska. He saw and photographed the great whales that used to live in our waters -- the blue, right, sperm and humpback whales. He will show these photos and some from his work on grey whales off Vancouver Island and humpbacks in Hawaii. Jim will also discuss his recent work with the West Coast Whale Foundation and the ambitious film project, *Island of the Whales* made for the TV science program *Nova*.

Jim is working with F.E.R. on a biodiversity study of the Megin River in Clayoquot Sound. We will be able to hear more about the importance of this study and its relationship to the issues on the west coast of Vancouver Island.

This event is jointly sponsored by F.E.R., Friends of the Royal B.C. Museum and West Coast Whale Foundation. The cost: \$4 for non-members, \$3 for members, \$2 for children.

Carmanah and Walbran Marbled Murrelet Nesting Sites

Join **Irene Manley** on day or overnight trips to the Upper Carmanah and Walbran nesting sites of the Marbled murrelet.

Trips will be organized on demand through the fall, sponsored by the Nanaimo local of W.C.W.C. Interested? Call 753-WILD.

Squamish Eagles and Baynes Island Ecological Reserve

January 26 and 27, 1991

This field trip to the Squamish River to see the large congregations of bald eagles feeding on the late spawn of chum salmon. Conditions permitting we will also visit Baynes Island on the Squamish River. Volunteer warden and professional naturalist **Al Grass** will lead the trip. If there is enough interest we can spend Sunday X-Country skiing in the Diamond Head or Whistler area. Good raingear, winter clothing and waterproof boots are required. Bring a lunch. Those coming from Victoria will take the 7:00 a.m. ferry from Nanaimo to Horseshoe Bay. Meet at the Big Scoop near the terminal at 8:40 a.m.

Phone Henry Bauld at 721-5962 for details.



Looking Ahead

Further details on these trips in upcoming newsletters.

Kyuquot Summer Field Camp

The great success of last year's summer camps prompted West Coast Expeditions to offer us the opportunity of coming to Spring Island again next summer. We very much enjoyed our adventures, the scenery, the diversity of wildlife, learning about the issues in Kyuquot Sound, and the hospitality at our two camps last year.

Checleset Bay and the area near Kyuquot Sound, off the northwest coast of Vancouver Island, is a naturalist's paradise. With the backdrop of the Brooks Peninsula, this maze of rocky reefs, islets, bays, beaches, estuaries, and forests supports an amazing array of lifeforms. Touring from our base camp we will see ancient fossil deposits, beautiful sand beaches, lush rainforests, sea otters frolicking in the kelp, northern sea-lions on their haul-outs, sea-birds on their nest-sites, exceptionally rich intertidal life and silvered carved poles on abandoned village sites of the West Coast (Nuu-chal-nuth) people.

Jerry Lange, our host at Spring Island, will pick up the group at Fair Harbour and transport us by boat to this wilderness area. We will visit the Checleset Bay and Tahsish Estuary ecological reserves and the threatened big spruce Ecological Reserve Proposal in the lower Tahsish River. We will have field sessions on marine ecology, forest ecology and native uses of plants. As well there will be time for walking on the beach, reflection in the forest, discussion over the campfire, fishing, kayaking and taking in the scenery.

The Sierra Club has just released a video on Kyuquot Sound featuring the Tahsish and some of these beautiful areas and documenting the forest destruction that has taken place. West Coast Expeditions assisted in its production. It's available for \$20 from the Sierra Club's Victoria office or Ecology House, in Market Square.

Seabirds, Ancient Forests and the Krajina Ecological Reserve A Sailing Adventure in the Queen Charlotte Islands May 29 to June 8, 1991 (about)

Sail on the beautiful *Darwin Sound II* to one of the most spectacular and remote places on the British Columbia coast. Join Irene and Al Whitney and naturalist Trudy Chatwin for a trip along the north and west coasts of Graham Island, the area proposed as a Haida tribal park. This will be a voyage of discovery.

Witness hundreds of Ancient murrelet chicks leaving their burrow nests and making a dash for the cold waters of the Pacific. Visit the ancient Haida villages of Kiusta, Tian, Dadun'slung, and Kung. Walk

magnificent sandy beaches and explore the amazing diversity of the rocky shores. At least two days will be spent exploring the Vladimir Krajina Ecological Reserve around Port Chanal and Hippa Island. The towering Sitka spruce forests, estuary, and spawning sockeye salmon are spectacular. Wild Hippa Island and its seabirds are a photographer's paradise. We will also visit such places as Langara Island (famous for its spring salmon fishing), Frederick Island, Lepas Bay and Marble Island, and make an exciting return journey.

The 11-day trip will include comfortable accommodation aboard the *Darwin Sound*, gourmet meals, a two-day land tour of Graham Island, picnics in Tlell, visits to carvers' workshops and museums and a seafood feast in Masset before the cruise. The cost will be around \$2000. Dates, to be confirmed, coincide with the greatest seabird activity, around the first week of June.

Trudy has worked on sea-bird research and inventory in this north-coast area and is familiar with many of its special features and areas. She has worked for four years on the *Darwin Sound*, during which time the idea for this special Ecological Reserve trip was conceived.

Please contact either Trudy at 592-3559 or Pacific Synergies at 932-3107 for further details.

Nimpkish Island and East Redonda Ecological Reserves

Rolf Kellerhals is warden of Nimpkish Island Ecological Reserve, and Heather Kellerhals, warden of for East Redonda Ecological Reserve. Rolf has agreed to guide us to these reserves in the spring of 1991. Depending on boat transport to East Redonda, they may have to be separate trips. On Nimpkish Island grow a stand of 350 and 650 year old Douglas firs. Logging has disturbed the river pattern, threatening the trees. Rolf is a foremost B.C. hydrologist and has worked with various agencies recommending solutions to the Nimpkish problem. The hike up 5150 ft / 1570 m -high Mt Addenbroke on East Redonda is arduous -- fitness is required.

The Fine Print

WAIVER OF LIABILITY ON FIELD TRIPS SPONSORED BY FRIENDS OF ECOLOGICAL RESERVES

PARTICIPATION IN ANY FRIENDS OF ECOLOGICAL RESERVES FIELD TRIP IMPLIES THAT YOU SHARE RESPONSIBILITY IN DECISIONS ABOUT WHERE AND HOW TO TRAVEL. PARTICIPANTS MUST REALIZE THAT SOME TRIPS ARE IN WILDERNESS AREAS WITH INHERENT DANGERS AND CONDUCT THEMSELVES ACCORDINGLY. NEITHER FRIENDS OF ECOLOGICAL RESERVES NOR ANY MEMBER OR LEADER WILL BE HELD LIABLE FOR INJURY, MISHAP OR PRIVATION ENCOUNTERED ON A FIELD TRIP.

The Old Growth Strategy Project So Far

The Ministry of Forests (MoF) established the Old Growth Strategy project to deal with public concern that the value of old-growth forests is widely ignored in the allocation of timber rights and granting of cutting permits. In *Towards an Old Growth Strategy: Summary of the Old Growth Workshop*, published in March 1990, the issue is framed thus:

"The lack of an explicit recognition of non-timber values within old growth forest is resulting in continued conflicts over specific old-growth stands. These conflicts will become increasingly bitter as old-growth forests disappear."

At the first meeting of a working group in April, the project set up teams to examine five key issues:

- Ecological research and inventory
- Old growth values
- Policy development
- Management practices and
- Conservation of areas

This last team had the task of identifying critical old-growth areas which need to be placed under short-term deferral from development while their value for long-term preservation is assessed. Vicky Husband sat on this team as a member of Friends of Ecological Reserves. The project solicited nominations for candidate areas for deferral and set a deadline of August 1. Selection of candidate areas, "was referred to a sub-committee.

The Friends made at least four submissions.

A 78-page report, *Short Term Deferral of Critical Areas of Old Growth: Recommendations of the Conservation of Areas Team*, released on September 13, shows the team received 127 proposals affecting 89 locations and of these:

- 17 were proposed for deferral
 - including East of Kokanee E.R.P.
- 2 were rejected as "not site-specific"
- 25 were referred to other planning processes
 - including Slim Creek E.R.P.
 - Megin River and four others, referred to the Clayoquot Sound Task Force
 - Klaskish - East Creek, referred to the West Strathcona Planning Process and others, with a notation to "seek a larger ecological reserve"
- 2 were referred to "larger government studies"
- 8 were referred to ongoing study of the Marbled murrelet

20 were deemed "not under imminent threat"

11 were "not recommended for deferral"

including the Lower Tsitika -- "elsewhere represented" and
4 areas were "not resolved"

including the Lower Tahsish / Kwois.

Total area recommended for deferral: estimated less than 3 000 hectares. Vicky Husband points out that the total area logged in B.C. last year was about 270 000 ha. "Deferral of entire watersheds was totally ruled out. And subjective values can't be considered, only biological. So you can see how we're 'keeping our options open.'"

Conservation of Areas: Deferral Review Process, dated October 3 and updated October 12, outlined a process that will provide:

"an opportunity to ensure that all available information needed for assessing a candidate area has been included in the review... particularly the information necessary to define candidate areas initially and to be able to use the screening criteria of watershed integrity, degree of fragmentation, habitat significance, subjective values and scarcity of the forest type.... The review process is also intended to ensure that economic and social impact concerns are assembled so that the Inter-ministry Management Committee can inform government of the implications of recommended deferrals."

The seven-member review team are meeting weekly through December to analyse incoming requests for reviews of original deferral recommendations.

MoF's deferral review form may be sent to:

Old Growth Strategy Project Office

1927 St Ann St

Victoria, B.C. V8R 5V9

Phone: 598-9003 Fax: 598-9001

The actual decision to defer areas will be in the hands of cabinet.

Peter Grant

Lower Tahsish Valley Under Review

The following is excerpted, with minor editorial changes, from the October 1990 KEEPS Newsletter, published by the Kyuquot Economic and Environmental Protection Society (KEEPS).

Every major river of Kyuquot Sound has seen significant logging activity, even the venerable Tahsish. About 40 per cent of the old growth in the Tahsish watershed's upper half has been logged and harvesting proceeds at a steady pace.

OLD GROWTH DEFERRAL REVIEW FORM

CANDIDATE AREA: _____

PERSON OR GROUP SUBMITTING REQUEST FOR REVIEW:

Name: _____

Address: _____

Phone: _____

Fax: _____

1. GENERAL STATEMENT OF CONCERN:

2. SPECIFIC REASONS FOR APPEAL:

3. NEW INFORMATION PRESENTED: (list here and attach any documents)

4. CONCERNS ABOUT IMPACTS OF DEFERRAL:

5. CURRENT DEVELOPMENT STATUS: LICENSES/PERMITS

6. SPECIFIC CONCERN ABOUT TIMING:

submit request to:
OLD GROWTH STRATEGY PROJECT OFFICE
1927 St. Ann Street,
Victoria, B.C.
V8R 5V9
Phone: 598-9003
Fax: 598-9001

The forested lower Tahsish is virtually separated from the logged upper watershed by steep mountains, waterfalls, and a rock-walled canyon. Alone in Kyuquot Sound, the Lower Tahsish remains a large, untouched, ancient forest.

Here, on the northwest coast of Vancouver Island, is an outstanding wilderness of recognized importance: majestic old growth, including giant Sitka spruce and Canada's tallest western hemlock; an unsurpassed wildlife habitat, with large populations of Roosevelt elk, cougar, bear, and wolves; one of the coast's richest salmon grounds; an extensive estuary providing critical bird habitat, Marbled murrelet nesting grounds; good hiking, canoeing, camping, exploring in a true wild setting. A historic trail linking the west and east coasts of Vancouver Island followed the Tahsish. The Tahsish is the home of the hereditary chief of the Kyuquots, and therefore figures prominently as a spiritual heart of their territory.

The integrity of the Lower Tahsish is now seriously endangered. MacMillan Bloedel is proceeding with its logging plans, and hopes to soon blast a road through the canyon to gain access to the valley's valuable timber.

Historical Overview

1981-1983: Public concern over the Tahsish encouraged the Ministry of Forests to establish the Tahsish Task Force. The members were unable to reach agreement over the fate of the lower Tahsish and three options were presented: no logging; partial logging; and full-scale logging.

1985: The provincial government decided to allow full-scale logging.

1989: Public concern over the disappearance of old-growth initiated a Ministry of Forests Old Growth Strategy Project. Friends of Ecological Reserves, KEEPS, the Sierra Club and others submitted requests for deferral of the Tahsish. The Conservation Team reported on the Tahsish:

"It was agreed by all participants that this area contains recognized ecological and natural values of high significance... Most critical of all the watershed submissions in terms of short-term deferral and preserving options... This area, of all proposals on Vancouver Island, exhibits the most outstanding variety of ecological and subjective values associated with old growth. It is, therefore, the best candidate to become a major conservation area in the long-term strategy."

Why Wasn't Logging in the Lower Tahsish Deferred?

Forest industry members of the team would not accept a two-year deferral of the proposed logging in the Lower Tahsish. In their view, too much time and energy have already gone into the Integrated

Resource Management Plan -- the logging plan -- to permit a second look now. The existence of a logging plan justifies the plan's implementation...

What Now?

As the Conservation Team could not agree on deferral the matter was sent to an Inter-ministry Management Committee for a decision.

Every letter sent to the Committee will have an impact. Explain in your own words why logging in the Tahsish should be reassessed.

Write to: John Cuthbert,
Chairman, Inter-ministry Management Committee
Old Growth Strategy Project
Ministry of Forests,
595 Pandora Street,
Victoria, B.C. V8W 3E7

Send copies to:

Premier W. Vander Zalm
Parliament Buildings
Victoria, B.C. V8V 1X4

KEEPS
Kyuquot, B.C. V0P 1J0



Robson Bight and Tsitika Valley Update

Public and scientific concern mount over the fate of the Robson Bight area as MacMillan Bloedel logs the old growth forest in the Tsitika Valley bottom and increasing tourist traffic pressures the unique killer whale habitat. F.E.R. and other conservation groups advocate protection of the lower Tsitika watershed. Many of our members have written letters of concern.

The government set up an inter-governmental committee in May to study killer whales in Johnstone Strait. "This committee will provide a balanced review of the issues associated with Robson Bight. A better understanding of the interaction between killer whales and whale watching activities, logging and commercial fishing in Robson Bight will help ensure protection of the whales and their habitat." Minister of Forests Claude Richmond issued another press release at the same time: logging to proceed below Catherine Creek. Look like another instance of 'log while we talk.' The Old Growth Strategy left this important issue up to the forest industry-dominated Tsitika Follow-up Committee. Now people are being arrested for protesting the fact that logging went ahead without the public review Mr Richmond promised. If we are to have balanced forest management, development of these contentious areas should be deferred while they are studied and under public review.

The Kitlope Valley

Gardner Canal is a deep fjord that winds into the Coast Mountains south of Kitimat, past Kemano and into the Kitlope River valley.

Kitlope means "the people of the rocks," and to the Haisla people, the area is the centre of one of the most extensive and elaborate complex of myths on the Northwest coast, as well as a major food-gathering area, with all species of salmon, oolichan, moose, bear, deer and mountain goat. Five known traditional winter village sites and innumerable old oolichan camps and other archaeological sites dot the lower reaches of the river. The setting: the magnificent granite mountains with snow-capped tops... Glaciers and glistening streams... The pristine beauty of Kitlope Lake... The turquoise river, which meanders and braids and forms a rich estuary as it meets the canal.

"The south end of Gardner Canal is the largest contiguous area of unlogged temperate rain forest remaining on the B.C. coast, possibly in the world. The area includes three large unlogged watersheds, the Kitlope, Tsaytis and Kowesas. The Kitlope alone is approximately 300 000 hectares and the whole area is in excess of 500 000 hectares" -- *The State of the Temperate Rain Forest in British Columbia*, a 1990 study by Keith Moore for Conservation International.

The Kitlope area is part of Tree Farm Licence 41, held by Eurocan Pulp and Paper Company, whose 1986-90 management and working plan deemed its timber uneconomic because of its remoteness. Now the company want to log 105 000 cubic metres a year. Recently they announced they won't start for at least two years.

Five proposals for deferred development were directed to the Old Growth Strategy project. Deferral was refuted because there was no consensus on the necessity to preserve intact watersheds. That issue "extends beyond the Old Growth Strategy mandate."

Two years gives us much-needed time to educate ourselves and shape the policies that will see this world-class natural area preserved.

Josette Wier, Kitimat

Khutzeymateen Valley Research Update

F.E.R. recently received the Working Plan for the Khutzeymateen Grizzly Bear Study. News of three other components of the Khutzeymateen Research Project -- logging scenarios, particularly, now underway -- are not forthcoming from the Ministry of Forests.

During a seven-day visit in September, Ralph Archibald of the Wildlife Branch counted more than 20 individual grizzlies.

Stickleback Research

My biological investigations on the Queen Charlotte Islands (QCI) began in 1967. Since 1975 I have focussed on evolutionary relationships between the giant stickleback fish and diving seabirds at the Drizzle Lake Ecological Reserve (ER52) and, with my colleague Sheila Douglas, studied the reproductive and foraging biology of the Red-throated loon. During this period I have expanded my attention to include biological and limnological sampling from 380 lakes throughout the QCI, including those on and in the vicinity of the reserves at Tow Hill (ER9) and Rose Spit (ER10) and the Krajina reserve (ER45) on the west coast of Graham Island. The research is diverse. Many investigations are ongoing and others are in various stages of completion. Funds from F.E.R. have allowed me to complete several sections of the research.

One of the unusual aspects of the Drizzle Lake stickleback is the exceptionally large adult size of the fish. Stickleback typically range from 40 to 70 mm. in length, but at Drizzle Lake they reach 110 mm. The reason for this gigantism is unknown. From analyses of trout stomachs and monthly estimates of trout numbers in the lake, I determined that adult stickleback represent only four per cent of the total stickleback eaten yearly by cutthroat trout. This suggests that adult stickleback are too large for trout to swallow. Given, however, that adult stickleback represent only about four per cent of the total numbers of the species in the lake, the trout may simply be taking stickleback in proportion to their abundance. To eliminate this possibility and test whether the giant stickleback were protected from trout as a consequence of their size, I carried out a series of predation experiments by offering trout of different sizes a range of stickleback also differing in size. With a video camera and the help of various assistants (Bristol Foster, local high school students) I was able to get data on 1600 separate feedings, from which I determined which ones got away after being captured, which got eaten and how long it took to swallow the stickleback.

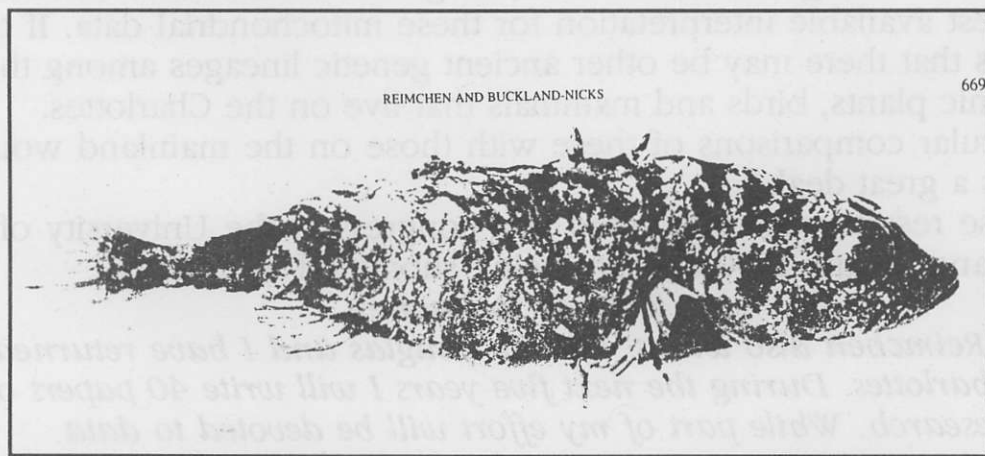
Some results were expected and satisfying, others puzzling. Virtually all small stickleback, even with their large spines, were eaten, while the giant stickleback were largely immune from predation by even the largest trout. While it took only several seconds to swallow a small stickleback, trout chomped on giant stickleback for up to 20 minutes before giving up and spitting out the stickleback, which swam away, somewhat scared and scarred but surviving. It was difficult to get a trout to follow through with an attack on an adult stickleback. This would be tremendously useful for

the stickleback, which builds its nest in shallow waters and has to defend the territory around from all intruders. There are 21 species of stickleback predators at Drizzle Lake, and trout, which consume the most stickleback, may be the most important predator which has led to the evolution of giant adult sizes.

This work is published in the *Canadian Journal of Fisheries and Aquatic Sciences* (47: 1194-1205, 1990) and in *Copeia* (in press).

A second study completed last year with my colleague Dr. Johnny Buckland-Nicks of St. Francis Xavier University, Antigonish, N.S. concerned a population of spine-deficient stickleback in Rouge Pond, on the district lot adjacent to the Tow Hill ER. Several years ago I discovered that the stickleback in this small pond contained a novel covering of cysts over the entire body and head. Remarkably, these cysts were photosynthetic and appeared not to harm the fish. After a great deal of work on the electron microscope and with further assistance of Dr. F.J.R. Taylor (in Oceanography at U.B.C.), we have now identified these as a new species of dinoflagellate without any clear affinities to any known dinoflagellate. Nothing comparable to this association has been seen throughout North America or Europe, and we are still not sure of the significance of the finding. Some peculiar limnological characteristics of this muskeg pond and surrounding area may have resulted in this association, or, possibly, the population of stickleback is a relic from preglacial periods. This possibility, which I discounted until recently, may be the most likely interpretation. I am continuing plankton samples of this pond and Johnny is culturing the dinoflagellates in an effort to find each of the stages in the complex life cycle.

This work is published in the *Canadian Journal of Zoology* (68: 667-671, 1990) and in *Journal of Phycology* (in press).



"Threespine stickleback from Rouge Lake with numerous dinoflagellate cysts embedded in gelatinous coating (visible as white areas on eye and body)."

Many species on the Charlottes -- the black bear, the short-tailed weasel, the Saw-whet owl and the stickleback -- have features distinctive from their relatives on the mainland. Did they separate in the post-glacial era (less than 12,000 years ago), or did they separate earlier and survive in an ice-free refugium, as various scientists have postulated but never proven? A breakthrough in molecular technology, restriction endonuclease analyses of mitochondrial DNA, provides the opportunity to answer this question realistically.

My graduate student, Pat O'Reilly, has looked at 12 stickleback populations, including the giants at Drizzle Lake, the spine-deficient at Boulton Lake and those at Rouge Pond with their unusual dinoflagellates. Several findings emerge from this difficult and expensive study. The giant stickleback at Drizzle Lake and the spine-deficient stickleback at Boulton Lake have mitochondrial clones virtually identical to marine stickleback near the Charlottes, which suggests that these unusual stickleback have a very recent, post-glacial origin. Morphological evolution can proceed very fast, and this suggests that some of the other endemics on the Charlottes may also be recent in origin. Alas! nothing is ever so simple: the mitochondria of the Rouge Pond stickleback and of three other populations on the northeastern tip of the Charlottes are highly divergent from all other stickleback. Using the "molecular clock" developed for mitochondrial DNA, it would appear that these fish may have separated from all other stickleback around the Charlottes about 1.2 million years ago! The northeastern corner of the Charlottes may have been an ice-free refugium for much of the Pleistocene era, when repeated glacial advances occurred over the rest of the Charlottes and the B.C. mainland. I am dubious of this conclusion, because the area is of low elevation and appears to be underlain by glacial outwash moraine. The molecular divergence is, however, so great that extended isolation is the best available interpretation for these mitochondrial data. If true, it means that there may be other ancient genetic lineages among the endemic plants, birds and mammals that live on the Charlottes. Molecular comparisons of these with those on the mainland would tell us a great deal.

These results were presented at a congress at the University of Maryland in July 1990 and are being submitted to *Science*.

Tom E. Reimchen

Dr. Reimchen also writes: "Sheila Douglas and I have returned to the Charlottes. During the next five years I will write 40 papers on our research. While part of my effort will be devoted to data collection, my major investment of time will be in data analysis and manuscript preparation."

In Memoriam Dr. Mike Bigg

Dr. Mike Bigg was the primary researcher responsible for knowledge of the British Columbia population and social organization of killer whales. His pioneering identification research during the time when over 70 whales were being captured led to the discovery that there were only about 300 orca in British Columbia, not the thousands previously thought. This identification work led to protection of these magnificent marine mammals and ultimately to the far different attitude people have towards orca today. He made significant contributions to the knowledge of other marine mammals such as harbour seals, fur seals, and sea-lions. Dr. Mike Bigg was one the instigators of both the Checleset Bay Ecological Reserve and the Robson Bight Ecological Reserve.

He died on October 18 after a long fight with cancer.

A bursary is being set up in his honour.

Biological Diversity: What's It All About?

Excerpt from an article by Dr. Jim Pojar in the Spring, 1990 issue of Bioline, published by Association of Professional Biologists of B.C.

Biodiversity is the variety of life in an area, which could be as small as a decaying log or as large as the biosphere. The full range of natural variety includes the genetic diversity of populations, the number and kind of different species, the distribution and abundance of plant and animal communities and of ecosystems, and the myriad of ways in which living things actually live and interact. Genetic diversity involves genotypic variation within a taxon. Species diversity is a measure of the richness of different species, both in numbers and in relative abundances. Ecosystem diversity is a landscape concept. And functional diversity transcends all three of these levels of organization and reflects the variety of processes whereby organisms interact with other organisms and with their physical environment.

Why Conserve Biological Diversity?

Let me count the whys:

1. It's going fast. Biodiversity is besing reduced at a rate without precedent in human history. During the next few decades, human activitties will cause the extinction of more species than at any time since the dinosaurs disappeared 65 million years ago.

2. For its intrinsic value. This is the ethical, deep-ecology view, that all living things have the substantive right to exist, and it would be presumptuous to assume that some species, especially our own, are more valuable and deserving of attention than others.

3. Biodiversity is also valuable as a source of intellectual and scientific knowledge, recreation, and aesthetic pleasure.

4. Humans depend on plants, animals, and micro-organisms for food, medicine, shelter, and other products. Reduced biological diversity could mean losses of resources for research, agriculture, medicine and industry. In this regard, it is worth noting the concern of the International Society of Chemical Ecology, a group not renowned for its environmental awareness, over the implications of species impoverishment to the future discovery of useful natural products. A resolution passed in 1989 draws attention to our dependence on naturally occurring chemicals, urging conservation measures to stem the tide of species extinction, and calling for much more chemical "prospecting" to discover more of these precious resources.

5. Reduced biodiversity could also harm the functioning of ecosystems and critical ecosystem processes that moderate climate, govern nutrient cycles and soil conservation, control pests and diseases, and degrade wastes and pollutants.

6. Maintaining existing natural diversity makes sense because we cannot predict which biological resources will be most important to future needs.

7. It could be that systems with greater biological diversity are more stable in the long term, are more resistant to disturbances, to destructive oscillations in populations, and to biological invasions.

This article will be continued in the next issue.



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