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The Victoria NATURALIST

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OUR COVER


By Artist Helen Butler

This month's cover features a Peregrine Falcon by Sidney watercolour artist Helen Butler. Living on the waterfront of Roberts Bay provides the material for many of her paintings.

The young peregrine on the cover was protecting a crow which it had killed. Neither the noisy crows and seagulls nearby, nor Helen with her camera, bothered the bird, who continued to feed as though nobody was around. Painting and photography are two ways that Helen uses to capture the birds and animals that frequent the bay.

Helen is a native of British Columbia who grew up in the seacoast towns of Eagle Harbour, Graham's Landing and Gibsons. She studied art at the University of British Columbia and the Vancouver College of Art.



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Spectacular Movement of Gulls over Seymour Narrows

By Andrew C. Stewart

While visiting Brown's Bay, north of Campbell River, on March 18, 1993 I observed a large northward movement of gulls over Seymour Narrows. The birds were flying in well-defined flocks, often in 'V' formation, between 1000 to 2000 feet above sea level. Between 1600 hours (4 p.m.) and darkness (about 1840 hours) I counted 10,115 gulls, at intervals as follows:

1600 - 1700 hours	. . . . .	5438. gulls
1700 - 1730	. . . . .	1741.
1730 - 1746	. . . . .	1078.
1746 - 1800	. . . . .	1098.
1800 - 1825	. . . . .	618.
1825 - 1835	. . . . .	142.
1835 - dark	. . . . .	0.

Gull movements were observed sporadically on March 17, earlier in the day on March 18, and for the first few daylight hours of March 19. However, it was my feeling that the peak of this movement occurred on the afternoon of March 18 as recorded above.

The gulls were large, without obvious black wing tips, which suggests the species was the Glaucous-winged Gull (*Larus glaucescens*). It is unclear whether this impressive movement was part of a spring migration to northern breeding grounds or a local movement to new feeding areas. Discus-



Glaucous-winged Gulls and Mew Gulls feeding on Pacific Herring spawn in Parksville area, March, 1993. (Photo courtesy R.W. Campbell of the Royal British Columbia Museum)

sions with knowledgeable birders suggest the latter. It is possible these birds were moving to Pacific Herring spawning areas. It was interesting to note that a major northward movement of the commercial herring fleet was also occurring in Seymour Narrows at this time.

Also of note were 25 Bald Eagles (*Haliaeetus leucocephalus*) "fishing" in Seymour Narrows on March 17 at 1730 hours. In addition, numerous Northern Sea Lions (*Eumetopias jubatus*) were also observed at this location between March 16 and 19.

Andrew Stewart works with the Habitat Inventory Group of the Ministry of Environment, Lands and Parks in Victoria.

Velvet Ants at Rath Trevor Beach Park

By Bill Merilees

On a quiet sunny morning in July, 1992, young Michael Bilinsky, from Brentwood Bay, was returning to the campground following a visit to the beach. Just past the adventure playground, a small fuzzy ant-like insect caught his attention. Without hesitation it was captured and presented to the staff at the park's Nature House. Thus began a chain of events that ended at the Royal British Columbia Museum and in this report.

The small fuzzy creature that Michael captured was identified as a female Velvet Ant. Not really an 'ant' but, in fact, a parasitic wasp, Michael's specimen became only the second ever captured on Vancouver Island! Almost to the day, ten years earlier a single individual had been captured near the mouth of the Little Qualicum River.

On July 13th, B.C. Parks staff returned to the site and in quick order captured seven additional specimens, including a larger winged male. These are now specimens in the Royal B.C. Museum. Their identity has been established as *Dasymutilla californica* by Chris Guppy. In

British Columbia this species has previously been discovered in the Okanagan and Chilcotin areas (Chris Guppy, pers. com.).

Velvet Ants, in the vernacular of entomologists, are called Mutillids. Common names include 'woolly ants', 'cow killers' and 'mule killers'. The latter two names are attributed to the presence of a formidable stinger that is capable of inflicting a very painful puncture, (Biery, no date). The name "Velvet Ant" is aptly applied for the rich velvety pubescence on the abdomen, which may be bright red, orange or yellow. Contrasted to the black body, this coloration is quite striking.

The beach berm area at Rath Trevor Park, where these velvet ants were located, is noted for its large population of Sand Wasps (*Bembix* sp.). These long-bodied, but pale 'yellow jackets' are probably the host being parasitized by the velvet ants.

According to Chris Guppy, "... nothing seems to have been written about the biology of *Dasymutilla californica*". Therefore for the person with an interest and the dedication of J. H. Fabre, the noted French entomologist, a splendid opportunity exists. To this individual, many secrets of the

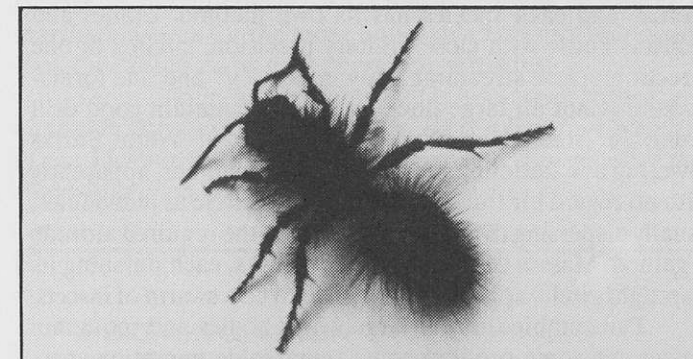
natural history will be unravelled about a very striking but venomous parasitic wasp, that in reality looks more like a 'velvet ant'.

REFERENCES:

Biery, T.L. (no date). *Venomous arthropod handbook*. Superintendent of Documents, Washington, D.C.
 Borror, D.J. and R.E. White. 1970. *A field guide to the insects of America North of Mexico*. Houghton Mifflin, Boston.

ACKNOWLEDGEMENTS: Thanks are gratefully extended to Chris Guppy of the Royal B.C. Museum for his interest and assistance in preparing this note. A very special thanks must go to Michael Bilinsky for his interest and curiosity in this 'mini beast'.

Bill Merilees lives in Nanaimo and is a past contributor to the *Victoria Naturalist*. He is the Visitors Service Coordinator for the Strathcona Region of the Ministry of Environment, Lands and Parks.



A Velvet Ant. (Photo: W. Merilees)

The Introduction of English Birds to Victoria

An attempt on a large scale to introduce English song-birds into British Columbia is at present being made. The Victoria (B.C.) Natural History Society is taking out a consignment of about 500 birds consisting of 100 pairs of Goldfinches, 100 pairs of larks [Skylarks] and 50 pairs of robins [English Robins]. They go by way of New York to Victoria.

In accordance with the arrangements which have been made, half of the consignment will be placed in Vancouver and taken care of there until next spring when they will be distributed throughout the woodlands of the lower mainland. The remainder will be placed in Beacon Hill Park aviary and kept until spring, when they will be given their liberty at various points on Vancouver Island.

It will be very interesting to hear if this extensive scheme of acclimatization proves a success. The climate of Vancouver ought to suit the British birds well.

This article, "spotted by Pamela Pinder", was published on November 14, 1903 in the magazine 'Country Life', Volume XIV, No. 358. Information from Vancouver or Victoria publications on these introductions may be in the archives at the University of Victoria if a VNHS member is interested in pursuing this further.

Distinguished Service Awards

G.W. (GIFF) CALVERT

Giff Calvert has been an enthusiastic member of the Victoria Natural History Society since joining the Society in the late 1960's. He has served on the Board of Directors and has been the Vice-President of the Society. Giff was also very involved in establishing the Nehring Fund which is used for special conservation and education projects sponsored by the Society.

In 1971, he bought 32 acres of land on Prospect Lake Road and, over 17 years, worked to turn it into a nature sanctuary where over 50 species of birds have nested. Giff was most generous in welcoming Society members to visit this area so that they could view and photograph the flora and fauna. This area has now been acquired by the District of Saanich as a nature sanctuary.

For ten years Giff has served as a member of the Saanich Parks and Recreation Committee. He has contributed to the planning and development of Swan Lake Nature Sanctuary, Colquitz Creek and Thomas Francis/Freeman King parks. Giff continues to provide assistance with many of the Society's events and it is fitting that he be awarded the Society's Distinguished Service Award.

HAROLD S. POLLOCK

Harold Pollock joined the Victoria Natural History Society in 1979 after retiring as a Professor of Engineering at Queens university and moving to Victoria. He served on the Board of Directors for four years and chaired the Habitat Committee and Awards and Recognition Committee and also represented the VNHS on the Board of the Federation of B.C. Naturalists. As chair of the Awards and Recognition Committee, Harold was responsible for establishing the Distinguished Service Award.

On moving to British Columbia, Harold brought with him considerable knowledge of, and a love for, the eastern bluebird, of which society he had been an active member. Upon joining the VNHS, he set about building bluebird nesting boxes in the hope of re-establishing western bluebirds in this area. Not only has Harold built over one thousand nesting boxes, he has contacted, enlisted and inspired a great many people throughout British Columbia to provide bluebird nest box trails with the result that both the mountain and western bluebirds have increased in many parts of the province.

Harold continues to be an active and valuable member of the Victoria Natural History Society and in appreciation of his many contributions is presented with the Society's Distinguished Service Award.

PREVIOUS DISTINGUISHED SERVICE AWARDS WINNERS

- 1989: Katherine Sherman, David Stirling, Lyndis Davis
- 1990: Charlie Trotter, Rob Mackenzie-Grieve, Anne Adamson
- 1991: Ed Coffin, Mark Myhof
- 1992: David Fraser, Margaret Mackenzie-Grieve

Getting There on a Low Energy Budget

By David Stirling

On September 22, 1988, I was in the Becher Bay area checking out the Turkey Vulture assembly. At 10 a.m. a heavy fog still blanketed the Strait of Juan de Fuca and valleys but the higher ridges were clear allowing the vulture's and other raptors to drift south from "up island", prevented, perhaps, from moving out of the area by the fog.

About noon the fog lifted with a NW breeze and suddenly, the weather changed to hot sun and blue skies. Vultures, relying on the sun to give them a boost, rose quickly (for TVs) from their roosts in the dark firs. As always, I began counting—150 in two chimneys. The birds were testing the wind, wheeling and rising higher like a swirl of autumn leaves. More birds drifted in. Now, only visible with the aid of binoculars, 280 birds rode aloft on an invisible elevator in the sky.

Their next move was a leisurely glide to the skies over East Sooke Park, where after more ketteling, they set off in line formation for the Olympic Mountains. They were soon lost to view in the glare. Ten minutes later I noticed a long line of black birds flapping low over the water toward Rocky Point. Encountering cool descending air over the Strait, they had been forced to return. Dropping rapidly, they had to use their own energy in order to reach land. The entire scene, from lift-off to return, was a dramatic spectacle.

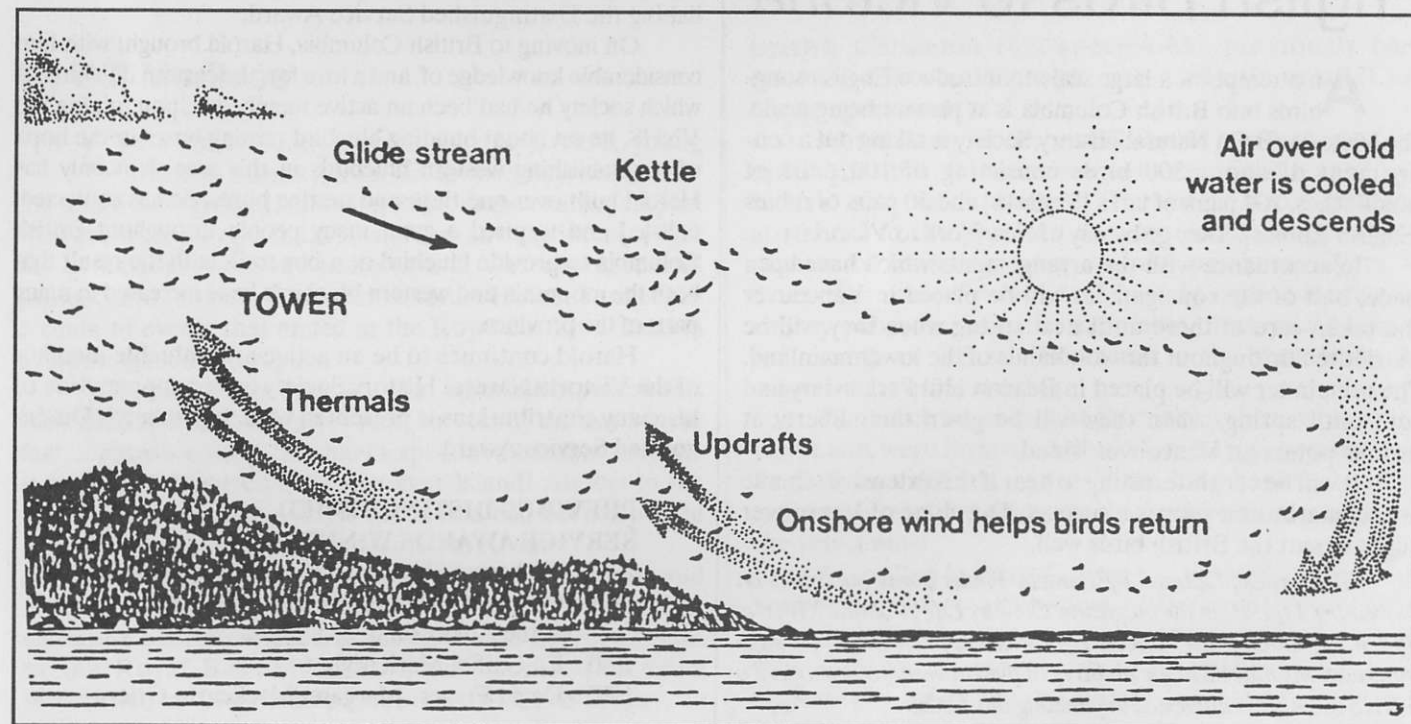
Many of the world's long distance fliers are small birds which make incredible journeys twice a year from North to South and back again. One of these, the Blackpoll Warbler, has a flight path which takes from the Yukon muskegs to

Venezuelan rain forests. This little fellow prepares for its epic flight by weeks of heavy eating, building up a reserve of fat to provide fuel for long days and nights on the trail. Larger birds, such as the cranes and raptors, make less strenuous journeys, using the sun's energy and avoiding long water crossings where cool air is falling. Strong updrafts, formed when heated air rises above open fields or where prevailing winds blow against cliffs and ridges, provide much of the necessary lift for soaring birds.

Large soaring birds are late risers. Ten in the morning, or even later, when the sun is well up, brings the birds into the sky from roosting and feeding. As they rise in a brisk thermal, the first ones may soon be hundreds of metres above the trees. This formation, known as a "tower" or "chimney", may contain hundreds of birds rising up over 2000 metres. When the top limit of the thermal has been reached the birds peel off, gliding away and losing altitude until another elevator is encountered.

Birds soaring at more or less the same height from a "kettle" and each species has its own method. Cranes and pelicans kettle with close military precision, circling in one direction before streaming away in neat "V" and line formations. But not all large flocking species maintain good drill order. In Israel, I watched a large flock of White Storks towering and ketteling in a most chaotic manner, apparently with no regard for traffic control. Hawks circle as individuals, usually dispersing over a wide area when the required altitude is gained. Masses of Broad-winged Hawks, each pursuing its own tight circle, appear at a distance to be a swarm of insects.

The combination of large water bodies and mountain ranges can some produce some remarkable migration spectacles. The best known of these avian bottlenecks are found in the Middle East where barriers such as the Mediterranean, Black Sea and Arabian Deserts deflect and concentrate huge numbers of storks, cranes, vultures, hawks and eagles over Tarifa-Gibraltar in Spain, the Bosphorus in Turkey and Eilat

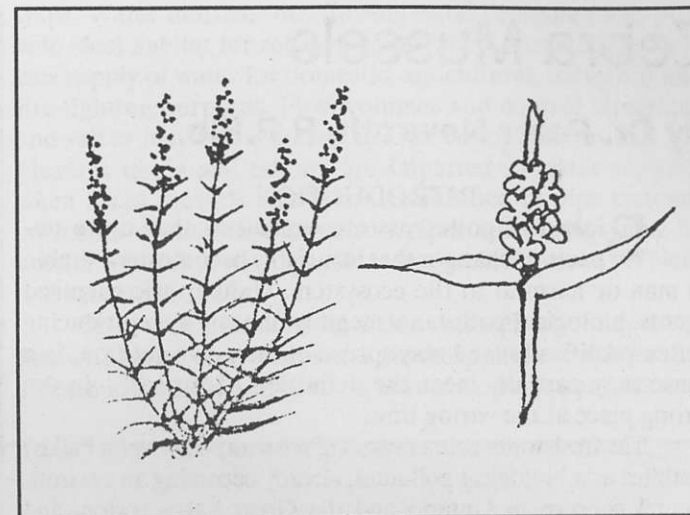


in Israel. In North America, similar barriers are produced by the Great Lakes, which force migrating raptors through bottlenecks at Hawk Cliff, on Lake Erie, and Duluth, at the west end of Lake Superior.

Until recently, raptor migration sites in British Columbia has not been thoroughly investigated. One, Rose Hill, at Knutsford south of Kamloops, has been known for some time as a good area in spring. Redtail and Swainson's Hawks are common here, while Golden and Bald Eagles, kestrels, accipiters and Short-eared Owls are often seen. Peak time, from mid-April to early May, coincides with a strong migration of waterfowl and thousands of Sandhill Cranes.

Interest in hawk watching in the Victoria area has "soared" over the past two years. The great autumn Turkey Vulture assembly west of Victoria has become well-known to both birders and the general public. Several places on the high ground—Babbington Hill, Cleanuh Lookout, Mallock Road and Mt. Matheson, collectively known as the "Becher Bay Headlands", are a major migration route for a variety of species including cranes, swifts and passerines as well as a marshalling area for the more noticeable raptors. Birders can look forward to many days of exciting watching.

David Stirling has been involved in world-wide birding and natural history tours for many years. He is a long time member of the Victoria Natural History Society and a member of the Hawk Migration Association of North America.



Purple Loosestrife (*Lythrum salicaria*)

Purple Loosestrife Alert

(*Lythrum salicaria*)

Parks and Conservation Committee

The hunt is on and we need your help! The Parks and Conservation Committee is preparing a map of sites in the Victoria area where this unwanted invader has appeared. Naturalists as a group are in an excellent position to identify these areas and we are asking for your help in gathering this information. We hope that a program for loosestrife eradication will be put in place and this map will make the job faster, easier and more cost-effective.

Purple Loosestrife grows in wet areas of all types. It is an escaped ornamental of European origin and is very invasive. It poses a threat to our wetlands because it rapidly takes over, chokes out native species and makes these habitats unfit for wildlife. The Canadian Wildlife Federation is very interested in halting its spread.

The following characteristics will help identify this plant:

- HEIGHT: 1-2 meters
- STALK: square, woody, several stalks per plant
- LEAVES: smooth-edged, lance-shaped, opposite and direct attachment to stalk
- FLOWERS: purple/pink in long spikes of small flowers, showy blooms June to September

Purple Loosestrife may possibly be confused with Hardhack (*Spirea douglasii*), which is a woody shrub with smaller, paler pink flowers in a more cone-shaped arrangement and a more feathery appearance. The leaves are also shorter, rounder and alternate on the stem. The flowering periods of the two plants may overlap but Hardhack usually blooms earlier.

If you find any loosestrife or have any questions about our project please call Doris Brix (479-7420) or Colleen O'Brien (388-7510).

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Zebra Mussels

By Dr. Peter Newroth, R.P.Bio.

INTRODUCTION

Biological pollutants are organisms that cause impacts or changes that invariably become undesirable to man or harmful to the ecosystem. Unlike toxic chemical agents, biological pollutants magnify impacts by reproducing (often prolifically) and may spread of their own volition. In a sense they partially meet the definition of "weeds"—in the wrong place at the wrong time.

The fresh water zebra mussel (*Dreissena polymorpha* Pallas) qualifies as a biological pollutant, already becoming an environmental concern in Ontario and the Great Lakes region, and threatening freshwater systems throughout North America.

The object of this article is to review biological features of zebra mussels and to encourage awareness about this new threat to fresh waters in North America.

ORIGINS AND BIOLOGICAL CHARACTERISTICS

Zebra mussels (described by Pallas in 1771 as *Dreissena polymorpha*) were first recorded in the northern Caspian Sea and Ural River. By the early 1800's, British canals were invaded by zebra mussels and rapid spread was simultaneously recorded in Germany, Holland and Denmark. Scandinavia and Switzerland reported its appearance in the 1940's and 1960's, respectively, and expansion through the Soviet Union continues to occur. Italy, Finland and now Canada and the United States record its presence. The publication by Mackie *et al.* (1989) provides an excellent review of zebra mussels literature and is acknowledged as the main source of biological information presented here.

The zebra mussel is a distinctive, strongly byssate bivalve with the characteristic alternating brown and cream or yellowish wavy banding of the shell lending the name (see illustration). The shell is shaped like that of the edible marine mussel (*Mytilus edulis*) reaching a maximum length of about 5 cm. The life history is characterized by a free-swimming veliger stage and production of strong and numerous byssal threads during adult stages. Byssal threads allow this mussel to attach to each other and in a wide range of habitats, without competition and in high densities. The yearly mussels may detach from the byssal threads, later producing new byssal attachments in another location. Young mussels may migrate to deeper water to seek warmer water and escape ice scouring in winter (O'Neill and MacNeill, 1989).

Reproductive capacities of zebra mussels explain part of the reason for its successful and rapid spread. Adults are sexually mature by the second year (of a five year life span based on European observations) and each female produces 30,000 to 40,000 eggs per year. Egg development occurs between water temperatures from about 12°C to 24°C. The free swimming larvae (veligers) have been recorded in waters ranging from 16°C to about 25°C but larval growth and development are suppressed at higher temperatures. Larvae may be present for periods of 2 to 8 months in the year, depending on climate and water temperatures, and each veliger may remain mobile for periods of about 8 to 21 days prior to settling (Anon. 1989).

Settling and attachment may be successful on any solid, non-toxic substrate and about 12 byssal threads may be produced per day by adults. Attachment is unlikely in flows greater than 2.0 to 2.5 m/second. Growth rates are dependent on food supply and temperature, and may be up to two cm in the first year. Calcium is required for shell production and levels must exceed 10 mg/L in the water for good development. Life spans of individual mussels are recorded to range from three to nine years. Zebra mussels are filter feeders (ingestion of particles up to 450 µm in diameter is reported) and adults may filter up to about one litre of water per day.

Zebra mussels are capable of anaerobic metabolism and may survive three to four days in anaerobic conditions. Waste materials are accumulated into pseudofaeces which are ejected from the inhalant siphon.

Zebra mussels may be found in water depths up to 50 m, thriving in depths from one to four metres in warm, slow moving water. The minimum density of veligers approximates the upper thermocline depth in European lakes. Populations have established in waters with wide ranges of trophic characteristics from oligotrophic to eutrophic, with the greatest densities in lakes with large surface area. Densities of up to 700,000 adult zebra mussels/m² have been recorded on a power plant intake in Lake Erie; colonies may build up to a thickness of 1.5 m (Anon. 1991).

Zebra mussels are subject to high mortalities during the veliger stage and they are most vulnerable during the settling phase. Fish, crayfish and waterfowl may consume zebra mussels, but the impacts of predators on European zebra mussel populations has been variable. Densities of mussels do not appear to have been limited by these predators in most locations. Parasites in zebra mussels have been documented but have not significantly affected mussel populations.

DISPERSAL

Both veligers and young adults contribute to rapid spread of zebra mussels because of their mobility. Downstream drift may occur with floating objects with attached adults or post-veliger stages (e.g., on aquatic plants). Transport of veligers or adults by boats to upstream areas or overland to other watersheds guarantees more extensive spread. Distribution of zebra mussels may be facilitated by live bait transfers by anglers or shipments of fish eggs or young fish for fish culture. Dispersal over short distances by crayfish, turtles, birds and insects (or possibly by mammals such as muskrats) should not be discounted. Since zebra mussels are small and difficult to harvest, they are unlikely to be gathered by humans for food.

Introduction of zebra mussels to North America is believed to have been about 1986, through discharge of ballast water from a freight ship probably originating from Europe. The first report of specimens (from Lake St. Clair) was in June, 1988; by 1989 colonies of 30,000 individuals/m² were found in Lake Erie (O'Neill and MacNeill, 1989). In 1990, all the Great Lakes were reported affected and zebra mussels had progressed about 100 km up the Erie Canal into New York State (Anon. 1991). By July, 1992, extensive spread had been documented across the State of New York and down the Hudson River, through the Illinois, Mississippi, Ohio and Tennessee Rivers (Zebra Mussel Information Clearinghouse,

June/July, 1992). This spread probably was much faster than predicted; some has been upstream with barge movement along navigable waterways.

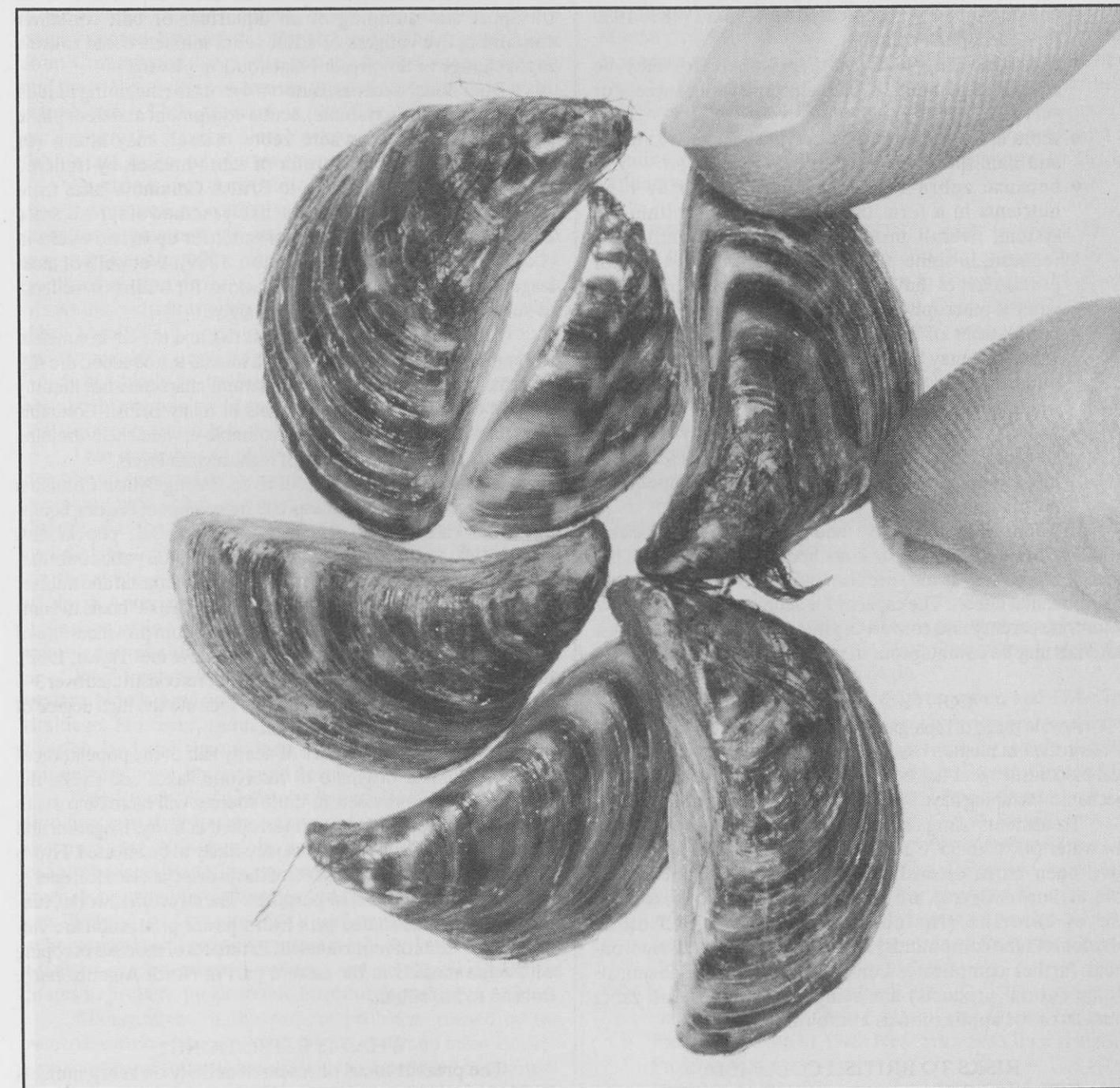
In Canada, spread down the St. Lawrence River was documented in 1991 to brackish waters at Quebec, into the Rideau-Trent-Severn system and Lake Simcoe and Muskoka Lake. Because of the volume of recreational boating in Ontario systems, spread is likely to accelerate.

IMPACTS

The main adverse impact of zebra mussels has been as biofouling agents, encrusting inside bores of pipes and water systems, and growing on boats, navigation buoys, fish nets and

traps. Water intakes, with flowing water bringing food, provide ideal habitat for zebra mussels. Their presence jeopardizes supply of water for domestic, agricultural, industrial and fire-fighting purposes. Flow volumes and control structures and valves may be restricted by mussel populations and unpleasant tastes and odours are imparted to water supplies when zebra mussels die. When established in pipe systems, corrosion of steel and cast iron pipes and fittings may be accelerated due to waste products from zebra mussels (O'Neill and MacNeill, 1989).

Shell accumulations from dead mussels also may interfere with valves and screens and the sharp shells could become a beach hazard. Die-off of zebra mussels in large numbers may



Zebra mussels (*Dreissena polymorpha*)

cause aesthetic problems in waterfront recreational areas. Cooling systems in outboard and inboard boat motors, and in industrial and thermal power producing plants, may be clogged by zebra mussels. In 1990, Ontario Hydro spent over \$10 million on zebra mussel control (Anon. 1990).

Ecological impacts of this biological pollutant are wide ranging, including:

- dense zebra mussel populations may act to encourage parasites whose definitive hosts are valuable waterfowl or fish species, or possibly man (Combes and Le Brun, 1990)
- because of the capacity to filter large amounts of water, plankton populations may be severely reduced—in Lake Erie transparency increased 85% and phytoplankton decreased 43% from 1988 to 1989 (J. Leach, pers. comm.)
- fish spawning beds on firm substrates may be colonized by mussels, reducing spawning success or survival
- zebra mussels may encrust crayfish and native mussel and clam species
- because zebra mussel pseudofaeces may bind nutrients in a form that slows recycling within the system, overall productivity may be significantly reduced; in some places extensive accumulations of pseudofaeces have encouraged growth of rooted aquatic macrophytes
- populations of some species of fish (e.g., carp) and waterfowl may be encouraged by availability of large numbers of zebra mussels, and in turn cause unwanted displacements and changes
- with few natural predators and the capacity to occupy sites not normally colonized by other species, zebra mussels appear to have few limits to development and perpetuation of large populations.

In addition to the above and additional unpredictable problems, most practical control methods to reduce adverse impacts of zebra mussels also are likely to cause direct or indirect environmental effects. The capacity for zebra mussels to improve water transparency and convert organic compounds to less toxic materials may be advantageous in some circumstances.

CONTROL METHODS

A wide range of biological, physical and mechanical methods to control zebra mussels have been tested or considered. No practical biocontrol agent has been documented but fine screens and mechanical scraping have been used in some situations.

Treatments using chlorine and molluscicides and use of hot water (45°C to 55°C for at least ten minutes) or pressure have been more extensive. Repetitive treatments, often several times each year, are required. Concern about excessive use of chlorine (including possible production of trihalomethane compounds) and its discharge to the environment further complicates control. A number of chemicals (some natural products) are being researched to kill zebra mussels or for application as antifouling coatings.

RISKS TO BRITISH COLUMBIA

Zebra mussels have not been reported in British Columbia waters, but no systematic search has begun. Early detec-

tion will be very difficult and the experience in the Great Lakes demonstrates that containment will be nearly impossible if the initial populations have reached reproductive age.

How could zebra mussels get to western provinces and states? At this time I am not aware of any national or international legislation or regulation to discourage either deliberate or accidental spread of zebra mussels. The present federal Canadian guidelines for discharge of ballast water by ocean-going vessels are not mandatory. Transport of recreational and commercial boats across Canada (or into British Columbia or other provinces from the United States) is unregulated. Discharge of ballast water into freshwater areas in Fraser Port, Puget Sound (and Lake Washington) and the Columbia River ports could repeat the Great Lakes experience. Even transport and dumping of an aquarium or bait container containing live veligers or adult zebra mussels could cause a rapid change in the present distribution picture.

Boat hulls, anchors, outboard motors (including hidden parts of the cooling systems), scuba equipment and float plane pontoons are places where zebra mussels may attach (or veligers may survive). Transfer of zebra mussels by trailered boat (only a three day drive to British Columbia lakes from Ontario) appears to be the most likely method of spread, since adult mussels may survive out of water for up to two weeks in cool, wet weather conditions (Anon. 1989). Wet wells of most larger boats provide suitable locations for adults or veligers to survive in the shade and out of sight.

British Columbia waters are at risk and the environmental and nuisance consequences of zebra mussel introduction are significant. There appear to be few natural characteristics limiting massive expansion of zebra mussels in many British Columbia lakes; conditions are especially favourable in watersheds draining the Rocky Mountains because of high calcium levels.

The interlaced networks of rivers linking British Columbia lakes and reservoirs and widespread movement of boating equipment will ensure rapid spread from initial B.C. populations. During 1980 and 1981, the Eurasian water milfoil public information campaign (with roadside check stations at coastal and interior British Columbia locations) inspected over 33,000 boats in summer months. Of these, 731 boats originated from provinces east of Alberta, representing 2.2% of the total (Dove and Taylor, 1982). Boaters originating from the U.S. and Alberta constituted over 3% and 25% respectively. These statistics indicate the high degree of boater mobility in Western Canada.

Since the water supplies of nearly half of the population of British Columbia originate in reservoirs, lakes and rivers, the presence of zebra mussels in these sources will increase costs to protect quality and ensure uninterrupted delivery. Irrigation and drainage systems and pumps also are likely to be affected. Hydro power is the source of over 90% of the provincial electrical energy for domestic and industrial purposes. The structures, works, tunnels and pipes associated with hydro power production are vulnerable to effects of zebra mussels. Estimates of the costs of coping with zebra mussels in the eastern part of North America range from \$5 to \$10 billion.

WHAT IS BEING DONE?

The present focus of research activity on zebra mussels in North America is on the Great Lakes, where valuable research has been ongoing for several years. Some informa-

tion from North America is beginning to appear in scientific publications but most literature now in print is based on European research.

The main burden of Canadian work has been assumed by the Province of Ontario (Ministry of Natural Resources and Ontario Hydro) and their focus must be to control impacts and reduce spread within their jurisdiction. Since the scope of the zebra mussel problem clearly is international and interprovincial, a large role by federal agencies might have been expected. However, zebra mussels appear to be a low priority for federal agencies; small amounts of funding have been allocated recently to federal research on this problem at the Burlington NWRI laboratory.

Of even more concern to us and our western neighbours is the absence of any federal initiatives or planning to help reduce spread beyond the Great Lakes. The International Joint Commission has addressed the ballast water problem and there is growing pressure to prevent further ballast water introduction. U.S. agencies in the Great Lakes area, and particularly the states of New York and Minnesota, are establishing task forces to address this problem.

Ontario is monitoring spread of zebra mussels and coordinating research on ecological impacts and control methods, as well as implementing a major public information campaign targeted at boaters. The province of Manitoba has initiated a public education program to help slow westward spread into Manitoba by discouraging transport by boaters (Anon., 1991). Also, Manitoba is anticipating the probable introduction of zebra mussels by providing industries and municipal agencies which are likely to be impacted with updated information about zebra mussels and current control methods. As of Fall, 1992, no zebra mussels have been located in Manitoba waters.

I am not aware of plans by other western provinces and neighbouring states to prepare for probable introduction of zebra mussels. Also, I found it disturbing that nearly all attendees at the 1992 conference that I attended represented jurisdictions already affected by zebra mussels. There was a glaring absence of presentations or even references to areas of North America not affected at that time, and there was no indication of any U.S. or Canadian effort aimed at containing existing populations.

Rapid zebra mussel spread appears inevitable within eastern North America, particularly through the Mississippi drainage. However, reduction of the rate of spread may be possible and the time gained can be used to advantage to minimize adverse impacts and develop new control measures.

The Province of Manitoba has initiated a public education program to help slow westward spread into Manitoba by discouraging transport by boaters (Anon. 1991). Also, Manitoba is anticipating the probable introduction of zebra mussels by providing industries and municipal agencies which are likely to be impacted with updated information about zebra mussels and current control methods. I am not aware of plans by other western provinces and neighbouring United States to prepare for probable introduction of zebra mussels.

Management of the present problems caused by unwanted, exotic plants and animals is costly and many of their environmental impacts are difficult to determine or quantify. The ballast water introduction of zebra mussels (and several other exotic species) into the Great Lakes probably was

preventable but regulatory agencies did not respond to earlier warnings. These agencies apparently lack the commitment, and possibly legislative authority, manpower and funding resources, to curb or prevent new cases.

The experience of the Water Quality Branch, B.C. Ministry of Environment, with the exotic aquatic plant Eurasian water milfoil, has demonstrated the difficulty of containing populations of this biological pollutant. However, preventive efforts, including intensive control of initial infestations, surveillance surveys and public information, have succeeded in reducing the rate of spread (Newroth, 1990). Management of zebra mussels may be expected to be even more unpredictable and challenging.

In British Columbia, key agencies such as B.C. Hydro have been alerted about zebra mussels and the provincial Ministry of Environment, Lands and Parks has expressed concerns to federal agencies about possible spread to western Canada. A 'Zebra Mussel Interagency Committee' has been established in British Columbia, primarily to advise government, to review potential impacts of zebra mussels and to examine practical means to delay introductions to British Columbia.

ACKNOWLEDGEMENTS: I wish to thank Dr. J. Leach, Ontario Ministry of Natural Resources, the coordinators of Zebra Mussel programs in Ontario and Manitoba and the New York State Sea Grant Cooperative Extension for providing material included in this summary.

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- Peter Newroth is manager of the Littoral Resources Unit, Water Quality Branch, of the B.C. Ministry of Environment.

Pinnipeds in British Columbia, Part II: Diet and Fisheries Interactions

By Tamara J. Guenther and Robin W. Baird

In 1990, a commercial fisherman was fined \$750.00 for disturbing sea lions at the Race Rocks Ecological Reserve, just south of Victoria. He was observed shooting a gun at four different locations on the rocks, where hundreds of sea lions were hauled out. His explanation was that he was shooting at tin cans while waiting for another boat to arrive and had no intention of shooting the animals. While the judge had to accept the explanation because the Crown counsel did, he cautioned that if there was evidence the fisherman had been shooting at the sea lions, and injured any of them, the fine would be higher.

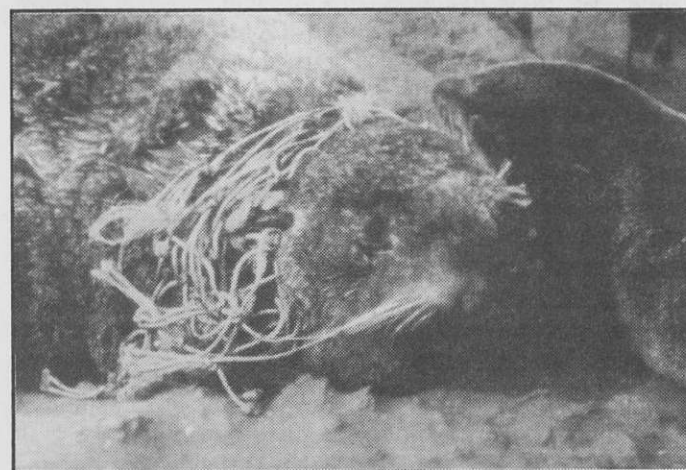
Regardless of whether they are real or perceived, conflicts arise when seals and sea lions interact either directly or indirectly with commercial fisheries, sports fisheries or aquaculture operations. Direct interactions, such as stealing fish off of lines or out of nets, sometimes causing considerable gear damage, is a great concern. A recent survey of salmon operators in B.C. by Rueggeberg and Booth (1989) indicates that over 60% of the farms experience problems with harbour seals and over 20% experience problems with sea lions. An additional problem arises when animals collide with fishing gear, often becoming entangled and either drowning or escaping with pieces of net or packing bands around their necks, resulting in long-term suffering and eventual death.

Indirect interactions involve competition between pinnipeds and humans for various fish stocks. Such competition is usually a result of overfishing by humans, or involves stocks of fish which are already depleted for some reason. While this affects humans economically, it can mean death for many

pinnipeds, either from the lack of food or because bounties or culling programs are introduced. Pinnipeds are certainly capable of causing a decline in a particular fish stock, however, this generally happens when the stock has already been overfished by humans or damaged through habitat loss.

To understand the extent of competitive interactions, extensive information on regional population sizes and seasonal and regional variation in diet is essential. In part I of this article, we reviewed information on identification features, distribution and population trends of the five species of pinnipeds found in B.C. (Guenther and Baird, 1993). Here we discuss what little is known about the diets of these species and interactions with fisheries in the Province.

The greatest problems in understanding the feeding habits of pinnipeds are the extreme regional and seasonal variability, and the uncertainties associated with different techniques for determining diet (Bigg and Fawcett, 1985; Harvey, 1989). Techniques used include visual observations of prey eaten, analysis of scat samples and examination of

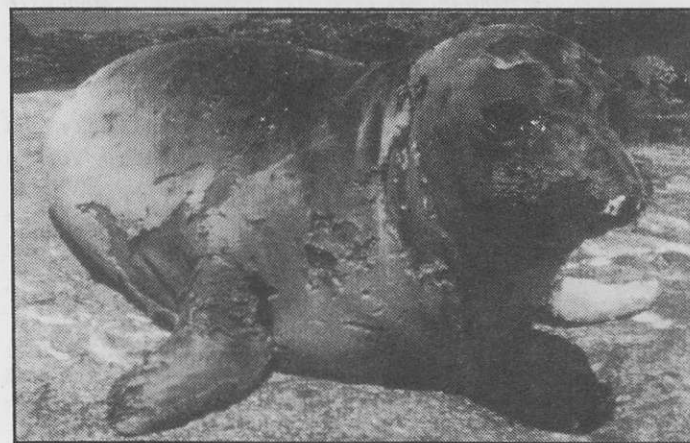


Northern Fur Seal entangled in Fishing Debris. (Photo: courtesy Pacific Biological Station)

stomach contents. Each has its own biases for accurately estimating what prey are taken and in what proportion, making comparisons between studies difficult.

Harbour Seal

Harbour seals usually eat the commoner species of fish in an area and their diet varies according to the time of year and the fish available (King, 1983). In the Pacific, flounder, herring, tomcod, and hake are commonly taken, as well as squid and lamprey (Scheffer and Slipp, 1944). A recent study in the Strait of Georgia, B.C. found that hake and herring accounted for 75% of the diet of harbour seals in this area (Olesiuk *et al.*, 1990). This study also found that the diet varied with season, with hake being favoured from April to November, and herring from December to March. In regards to the other 25% of their diet, Olesiuk *et al.*, (1990) found that it was composed of a wide variety of other species and varied depending on the area and period that each fish species was most vulnerable. For example, while salmonids comprised 4% of the overall diet, these were mostly adult salmon that were preyed upon primarily when found in high



Moulting juvenile elephant seal, hauled out at Race Rocks. (Photo: Robin W. Baird 1990)

concentrations while travelling to their spawning grounds. In general, harbour seals in B.C. can be considered opportunistic predators capable of adjusting their foraging patterns in order to take advantage of seasonally and locally abundant or vulnerable prey (Olesiuk *et al.*, 1990).

Northern Elephant Seal

Less is known about the feeding habits of elephant seals in British Columbia than the other species of pinnipeds. No diet studies have been undertaken here; knowledge of prey is based on a few anecdotal observations of feeding elephant seals and from food intake in more southerly parts of their range. Elephant seals have been occasionally observed eating dogfish shark at the surface in B.C. and adjacent U.S. waters (eg. Osborne *et al.*, 1988). Studies on feeding habits off of California and Oregon indicate they feed on a wide diversity of prey, both within the water column and bottom dwelling organisms. These include shrimp, pelagic red crabs, numerous species of squid and octopi, tunicates, skates, rays, sharks, ratfish, lamprey, and bony fish, such as whiting, hake, and rockfish (Antonelis *et al.*, 1987; Condit and LeBoeuf, 1984). All the available evidence implies that this species is the least likely of the pinnipeds to conflict with commercial fisheries, either directly or indirectly.

California Sea Lion

Extensive research on California sea lion feeding habits off of California has been undertaken, but in B.C. fewer studies have been done. California sea lions occasionally congregate at the mouths of certain estuaries during salmon runs but generally take a relatively small proportion of the salmon returning (Bigg *et al.*, 1990). Overall they feed mainly on schooling fish such as herring,

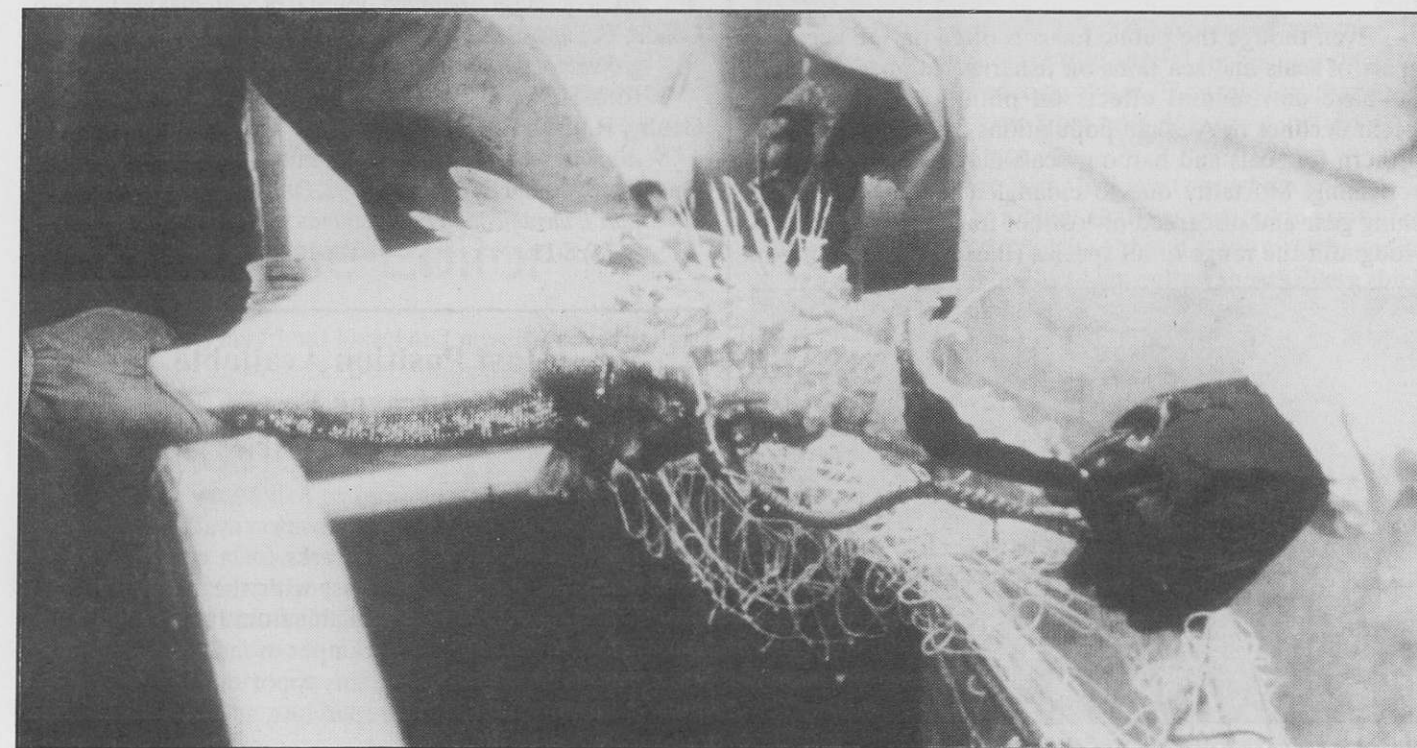
hake, pollock and dogfish, while salmon comprise about 10% of the diet and less than 1% of the commercial salmon landings in B.C. (Olesiuk and Bigg, 1988). California sea lions will take fish off of lines, and cause some problems during the short herring fishery in the Province, where they may tear holes in the gillnets by swimming through them (Olesiuk and Bigg, 1988).

Steller Sea Lion

In British Columbia, Steller sea lions have been recorded eating octopus and squid, lamprey, skate, dogfish shark, ratfish, herring, eulachon, whiting, rockfish, hake, halibut, lingcod and salmon (Pike, 1958; Spalding, 1964). Salmon only makes up a few percent of their diet (Olesiuk and Bigg, 1988). In Alaska, Steller sea lions have been occasionally recorded feeding on harbour seals and on northern fur seal young (Gentry and Johnson, 1980; Pitcher and Fay, 1982). Steller sea lions do conflict directly with fisheries, taking fish off lines and occasionally from nets, sometimes damaging the net in the process.

Northern Fur Seal

Knowledge of northern fur seal diets in British Columbia is derived from stomach contents of animals killed as part of a joint US-Canada research program from 1958-1974 (Perez and Bigg, 1986). Prey choice varies with season and area, but Pacific herring and various species of squid comprised about 70% of the diet during the months when diet was examined. Walleye pollock, sablefish, rockfishes, whiting, and salmonids form the remainder of the diet. The diet has probably changed over time with fluctuations in fish stocks; sardines were once extremely abundant in the eastern North Pacific but were overfished in the 1940's and stocks collapsed. There is some evidence that sardines were commonly eaten



Salmon damaged by harbour seal. (Photo: Courtesy of the Pacific Biological Station)



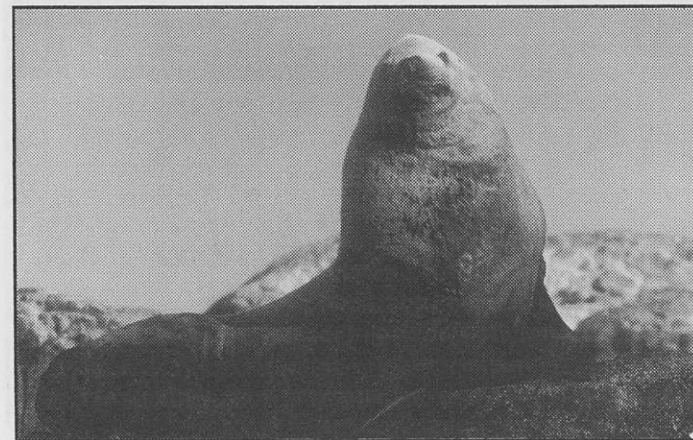
California sea lion eating a juvenile salmon, Race Rocks. (Photo Robin W. Baird 1993)

by fur seals off Vancouver Island in the early 1930's (Clemens and Wilby, 1933). Because of their generally offshore distribution in the Province few direct interactions occur with fisheries.

Discussion

Insufficient information is available to determine the extent of competition between humans and pinnipeds in B.C. Diets are extremely variable seasonally and geographically for each species but commercially important fish like salmon only comprise a small proportion of the diet of each species. Some local fish stocks have been so depleted from overfishing that they may be vulnerable to over-predation by pinnipeds but the complexity of interactions in the marine system make such determinations difficult. Ecological interactions, including pinniped predation on salmon predators such as dogfish and lamprey (Jameson and Kenyon, 1977), further compound the issues.

Even though the public focus is often on the negative impact of seals and sea lions on fisheries, competition may also have detrimental effects on pinniped populations. Recent declines in Alaskan populations of Steller sea lions, northern fur seals and harbour seals may be due in part to overfishing. Mortality due to entanglement in both active fishing gear and discarded or lost net fragments also occurs throughout the range of all species (Barlow *et al.*, in press),



Stellar Sea Lion hauled out at Race Rocks. (Photo: Tamara J. Guenther)

although little is known of the numbers killed in British Columbia.

The Fisheries Act states that it is unlawful to disturb seals and sea lions in Canada. However, the loss of catch and gear damage is a recognized problem and fishermen do have a right to protect their property. Unfortunately, fishing practices such as discarding unwanted fish or parts into the water teaches seals and sea lions that boats can be a source of "easy" food. In addition, using loud noises to try to scare animals away can actually result in attracting them instead. Researchers are continuing to experiment with non-lethal ways of protecting catches from pinnipeds, which will hopefully lessen conflicts in the future.

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Host Position Available Rathrevor Beach Provincial Park

B.C. Parks has a host position available open at Rathrevor Beach Parks for a congenial and knowledgeable couple to assist with the nature house program. The position is available from June to September. The host must have a camper or mobile home, etc. For further information on this opportunity, please contact Dave Forman, Area Supervisor, at 755 2483.

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- Tamara Guenther and Robin Baird coordinate the Marine Mammal Research Group which investigates and documents marine mammal sightings in B.C. waters. Data are archived in a database which is available to researchers and other investigators. For more information write to: Marine Mammal Research Group, Box 6244, Victoria, B.C. V8P 5L5, or phone (604) 380-1925 (fax 380-1206).

Letter to the Editor

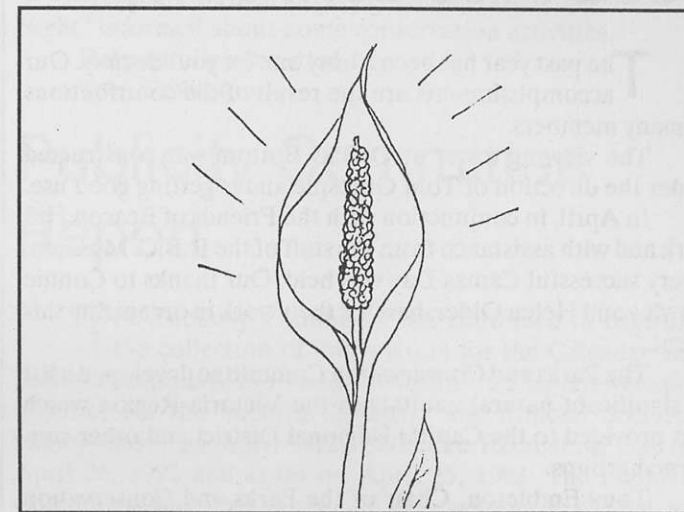
Recently, my friend Hazel and myself were fortunate to take a nine week "Becoming a Better Birdwatcher" course with Dave Allinson. We are both beginner birders and took the course to try and overcome the overwhelming confusion and intimidation when first trying to identify birds.

We both would like to send our compliments and appreciation to Dave on providing a very informative and most enjoyable course. Dave was very keen on sharing his vast knowledge of information and certainly helped the 'new birders' feel most welcome to this fascinating hobby.

We certainly have a much better insight to 'Birding'. Our special thanks to Dave for all your help and we look forward to becoming even better Birders.

Mrs. Sylvia May
Mrs. Hazel McDonald

FOR THE JUNIOR NATURALIST--



Swamp Lantern

Origin of a Name Anonymous

In their circle, Brownie (Junior Girl Guides) sat eagerly quiet, listening to a story:

... One Spring evening the Fairies held a festival party. Of course all the Fairy-folk came—gnomes, brownies, elves, pixies, fairies, leprechauns and so on. And also the small forest creatures were invited; they were delighted to watch the performance and join in the fun.

With so much merriment in process, it seemed strange to a passing fairy to see a small animal sitting forlornly at the far edge of "the green".

"Oh dear!" said the fairy. "Whatever is the matter?"

The little black and white animal replied in a small said voice: "I'm not allowed to go closer. They said I stink and must stay back; but I can't see from here. It is too dark, too dark!" A tear ran down his face.

"Well!" said the fairy, "we must see what can be done" She reached down to a plant that was just poking out of the damp soil. She pulled it forth so that it stood straight and tall (as tall as she was). It had a golden-yellow sheath, like a shield, in front of which stood a thick green-yellow stalk, as if it were a wick protected by that shield. Indeed, it shone forth across the distance to the fairies' party.

"Now can you see?" asked the fairy.

"Oh yes, indeed! Thank you very much!"

"This plant," explained the fairy, "will grow in places like this and it will be a lantern for those who need it. It will smell a little like you do, Skunk. For it is your lantern plant."

Skunk was very happy!

Now you who have heard the story might remember to call this plant Yellow Arum (*Lysichitum americanum*), Skunk Cabbage, or, best of all, Swamp Lantern.

Many people, children especially, are stimulated to learn more about plants and animals if they have interesting stories associated with them. Readers are encouraged to send in other examples for the Junior Naturalist.

1992 President's Report

The past year has been a busy one for your Society. Our accomplishments are the result of the contributions of many members.

The viewing tower at Quicks Bottom was constructed under the direction of Tom Gillespie and is getting good use.

In April, in conjunction with the Friends of Beacon Hill Park and with assistance from the staff of the R.B.C. Museum, a very successful Camas Day was held. Our thanks to Connie Hawley and Helen Oldershaw for their work in organizing this event.

The Parks and Conservation Committee developed a list of significant natural habitats in the Victoria Region which was provided to the Capital Regional District and other concerned groups.

Tony Embleton, Chair of the Parks and Conservation Committee, represented our Society at numerous meetings on the environment with various levels of government as well as other conservation organizations.

We were successful in getting the major portion of the important Parksville Flats/English River estuary saved. Our Society and individual members have contributed over \$3,000 to replenish nature trusts depleted coffers after the acquisition of the Parksville Flats area.

Under the leadership of Darren Copley, we are continuing to gather information on the importance of the Martindale Flats, particularly to wintering waterfowl.

A scholarship and two bursary awards were supported for University of Victoria Life Science students and one bursary for a student in the Environmental Technology Program at Camosun. The scholarship fund was enhanced by contributions from Bruce Whittington of the Field Naturalist, related to purchases by Society members.

We have continued to contribute funds to the Swan Lake Nature Program.

A successful Christmas Bird Count was held, as well as a Spring Bird Count and thanks to all who participated and, particularly, Dave Pearce who organized these events.

Our thanks to Brian Gates for conducting Birder's Night and for running the rare bird tape, and to the Goodwills for their help in the hotlining of rare birds.

Thanks to our Editor, Warren Drinnan. We have continued to produce a magazine of high quality. We have also

reprinted the Naturalists Guide to the Victoria Region.

We thank Pam Stacey for providing us with excellent speakers for our meetings.

Anne Adamson has arranged a variety of social events, as well as our great banquet.

David Allinson has arranged an outstanding collection of outings and our thanks go to him and all those who led various trips.

Dr. Ceska has been organizing Botany Night and has arranged a series of botany field trips.

Margaret Wainwright has continued to coordinate the Volunteer Conservation Observer Program for special areas.

Bev Glover and Shirley Embra have helped obtain publicity for Society events.

Audrey Copping, our efficient secretary, has kept our minutes and carried out a variety of other activities on behalf of your Society.

Our dependable treasurer, Gordon Devey, has kept our books and accounts in good financial order.

Lyndis Davis handles sales of Society books and materials.

We presented distinguished service awards to Giff Calvert and Harold Pollack for their contributions to the Society over the years.

Respectfully submitted,
Wallace MacGregor

Social Committee Report

The annual Christmas Bird Count Day was held on December 19, 1992, with David Pearce as Count Coordinator. A total of 140 species were recorded by 150 participants, down from last year's record of 152 species. The Tabulation Social was held at 7:30 p.m. in the Gordon Head United Church Hall with approximately 75 in attendance. A relaxed, happy evening with Christmas refreshments brought a busy day to a successful conclusion.

Once again our Annual Banquet, held on February 9, 1993 at the Princess Mary Restaurant, was a special event enjoyed by all. The attractive buffet, good food and pleasant surroundings was followed by an excellent talk by our guest speaker, Mr. Robert J. Ballantyne, Vice-President of the Canadian Nature Federation. He gave a spirited talk entitled, "Naturalists—Our Contribution to the World".

As I leave the Board because of conflicting interests, I would like to thank the President, Wallace MacGregor and Board members for their patience and kindness in every way. I found them to be dedicated and knowledgeable and willing to further the aims and work of the Society.

In closing may I take this opportunity to thank the members of the Tuesday group for their assistance. Without their continued help I could not have carried on. Special thanks to Dorothy Henderson, Freda Woodworth, Beth and Victor Chatwin and Vera Guernsey.

Respectfully submitted,
Anne F. Adamson

Parks And Conservation Committee

The team that makes a difference continues to promote conservation activities within the C.R.D. The team was made up of fifteen hard working members whose efforts were concentrated on a number of issues.

A. Investigation of the following five significant habitats:

- Continuation of the Martindale Flats Bird surveys
- Inventory of Blenkinsop Lake
- Information on Esquimalt Lagoon
- Information on Tod Creek Flats
- Construction of the Quick's Bottom bird blind.

B. Issues or concerns due to threats to the following areas:

- Mount Douglas Park
- Englishmen's River Estuary
- Haro Woods—Pat Bay re Boat Ramp
- Mystic Vale—Glencoe Cove
- Bilston Creek—Island View Beach
- Heal Lake—Beacon Hill Park
- Thetis Lake Park—Mill Hill

C. Development Plans for the Removal of Broom and Purple Loosestrife.

D. The Conservation Observers Program Lead by Margaret Wainwright continues to give the committee current information about the state of our immediate environment.

E. Representation on the following groups: Lyndis Davis—C.R.D. Round Table on the Environment; Mae Shearman—Hartland Landfill Task Force, Tod Inlet (FAMA Holdings) Round Table; Dannie Carsen—Victoria Parks & Recreation Commission; Tony Embleton—F.B.C.N. representative at the Vancouver Island C.O.R.E. (Commission on Resources and Environment) Table, F.B.C.N. representative in a coalition of similar groups that have met with various government ministries to discuss common conservation concerns.

F. Due to the efforts of Darren Copley the successful Purple Martin nesting box program continued. A nesting box program for Screech Owls at the University of Victoria was also started.

G. An ad hoc committee was formed to make recommendations with regards the Parks 90 and Wilderness 90 proposals and the Protected Areas Strategy.

H The identification of significant habitats was initiated and the list included wildlife viewing sites.

I. Dr. Chris Brayshaw made a very valuable contribution to Mary Morrison's Uplands park committee when he produced an impressive map of the Vegetative Zones.

J. Connie Hawley, in cooperation with The Friends of Beacon Hill Park, staged a very successful "Games Day" on April 25, during which the public was introduced to the birds,

flowers and Native history of the park.

K Jackie Wrinch has kept members attending "Birder's Night" informed about home conservation activities.

Respectfully submitted,
Tony Embleton

Publicity Committee Report

The Publicity Committee has continued to organize the collection of information for the Calendar and Bulletin Sections of the Victoria Naturalist. Displays were put together for the Victoria Lapidary and Mineral Society's Hobby Show, on April 9-12, 1992, and Recreation Day on April 26, 1992 and again on April 25, 1993. The Publicity Committee has also taken on the promotion needed for Camas Day (April 17, 1993).

Progress on a new Flier for the Victoria Natural History Society has been slow but may be available by the end of April. The VNHS stickers were reprinted and are available for sale through Tom Gillispie. My thanks to those who volunteered their time to be attendants at the display and to Tom for his help with the stickers.

Respectfully submitted,
Bev Glover

Birding Committee Report

A revitalized Birding Committee is meeting as this magazine goes to press. The Committee is now working on a variety of programs including an on-going bird surveys of Martindale Valley and Blenkinsop Lake and the construction and placement of Western Screech-Owl nest boxes at selected sites in Victoria. Other projects include a survey of some target species (to be held during the Spring Bird Count and in late May to early June) and a raptor-watch in the spring and fall.

All of these projects welcome and need your support and participation. They help in the recommendations our Conservation Committee makes to regional land use planners for habitat conservation in the Greater Victoria region. Mike Carson, serving as Bird Habitat Protection Chair, will act as a liaison between the Birding Conservation Committees on topics of mutual concern. A bird checklist and records subcommittee is looking into updating the current checklist, as well as reviewing recent rare bird reports.

Bird field trips continue each month with a variety of leaders gleaned from the locales. Birder's Night and its programs will continue to be ably run between September and May by Bryan Gates. However, a new addition to each Birder's Night will be a short talk on a "Bird of the Month" by selected VNHS members.

Respectfully submitted,
David Allinson

THIMBLE FARMS



Bedding plants – Hanging baskets

Shrubs & ground covers
and fruit trees.

RR1 Arbutus Rd., Southey Pt. 537-5788

Salt Spring Island

Growing Native???

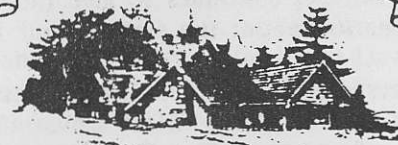
10% off native plants to VNHS members

Welcome To New Members:

- Jan. 27 Margaret Leyland,
of Wale Road.
- Jan. 27 Nick Johnson,
of Stonington Place:
is interested in hiking and
international birding trips.
- Jan. 30 Gloria Snively and J. Corsiglia,
of Hampshire Road:
study marine biology and botany.
- Jan. 31 Gordon Snider,
of Cook Street:
a gift from Linda Snider.
- Feb. 1 Paul Johansen,
of Foul Bay Road.
- Feb. 3 Dalia Hull,
of Admirals Road:
is interested in hiking, natural history
and conservation.
- Feb. 4 Julie Thomson,
of Pastel Crescent:
enjoys birding, mountaineering, scuba diving
and conservation of nature.
- Feb. 5 Dr. John Bardsley,
of Pender Park Drive.
- Feb. 10 Jean, Alex and John Day,
of Larchwood Drive:
are interested in birdwatching, wildflowers,
photography and sketching.
- Feb. 10 Suzanne Benoit,
of Vermilion in Alberta: is a birder.
- Feb. 10 Alex and Maureen Peden,
of Shore Way:
were active members in the
1950's and 1970's.
Welcome back.
- Feb. 14 Phyllis Head,
of Bazan Bay Road:
wants to set up a birdwatching group
in the Dominican Republic.
- Feb. 22 Joyce Danby,
of Esquimalt Road:
likes birding and field trips.
- Feb. 22 Julia Lavell,
of Maitland Road
enjoys birdwatching and marine mammals.
- Feb. 24 Tim Roberts,
of Viaduct Avenue West.
- Feb. 24 Don and Marianne Johnson,
of High Street:
are interested in wildflowers
and birds, owls in particular.

- Feb. 24 Anne R. Bryon,
of Michigan Street: is a birdwatcher.
- Feb. 26 Mike and Barb Corry,
of Maplewood Road.
- March 9 Bryon Thompson,
of Cedarwood Close:
is a birdwatcher.
- March 13 Mrs. Doreen Jones,
of Parker Avenue:
enjoys birding and general ecology.
- March 20 Michael and Carolyn Hoebel,
of Galiano Island.
- March 28 Renee Woodsend,
of Northend Road on Saltspring Island.
- March 28 Eileen King,
of Crescent Road:
enjoys birds and wildlife photography.
This is a gift membership from Joan Riecken.
- March 28 Debra Barr,
of Cook Street.
- April 5 Andrew C. Stewart,
of Telegraph Bay Road.
- April 5 Hazel and Vern McDonald,
of Simcoe Street:
enjoy birding and nature walks.

Yellow Point Lodge



A place apart...

- ~ 180 acres of natural, oceanfront parkland.
- ~ Relaxed country hospitality.
- ~ Fine home cooking.
- ~ Beach sauna and hot tub.
- ~ Salt water swimming pool.
- ~ 5 miles of walking and jogging trails.
- ~ Tennis courts, volleyball, badminton,
canoes, row boats, ping-pong.
- ~ 1 mile of waterfront with secluded coves
and beaches.

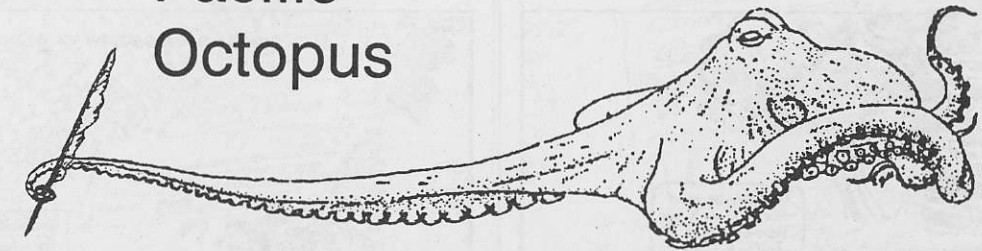


R.R. #3, Ladysmith, B.C.

VOR 2E0

604 • 245 • 7422

Pacific Octopus



This week I would like to introduce you to the Marine Life Sanctuaries Society of B.C. and to the concept of marine reserves. The society is in existence because there are no marine sanctuaries in B.C. "What?" you ask, "no marine reserves in beautiful British Columbia?"

"Yes," they reply. There are no bona fide marine reserves along the 27,000 kilometres of British Columbia's coastline. Whilst we have national marine parks, provincial marine parks and provincial marine ecological reserves there is not one single kilometre of our beautiful and unique coastline that is completely protected. Read on...

The society was formed in 1989 and has grown tremendously since then. Starting off as a group of concerned divers and marine enthusiasts the society now has more than 100 members from all walks of life.

"We are approaching the task of getting marine sanctuaries established in B.C. from many angles," says Andy Lamb, President of the MLSS. "We are meeting with politicians, both federal and provincial; we have groups of members in Vancouver, Vancouver Island and the Queen Charlotte Islands (Haida Gwaii) working to establish sanctuaries in specific areas; we are trying to educate the public through talks, posters and pamphlets; and we are promoting discussion and the exchange of information with regards to the whole concept of marine sanctuaries."

Berny Hanby, one of the founder members and current Vice-President of the society, chaired a special session devoted to marine life sanctuaries at the Canadian marine life conference last year in October. Two international speakers, Dr. Jim Bohnsack of the U.S. National Marine Fisheries Service in Florida and Dr. Bill Ballantine of the University of Auckland's Leigh Laboratories in New Zealand spoke at the conference and shared some of their first-hand experiences with marine reserves and provided some insights into how marine sanctuaries work and what they mean to society.

So what exactly are marine reserves or Marine Protected Areas (MPA) and what function will they fulfill? In a nutshell a MPA is an area of coastline, including subtidal areas that is completely protected from any exploitation but which is open to the public for non-destructive use. In other words diving, swimming and controlled boating are in but fishing is normally not. Marine reserves have been shown in other countries (United States, South Africa, New Zealand and Australia—to name a few) to fulfill a range of important functions. These include the obvious: tourism, education, sport, recreation... and the

not so obvious: MPA have been shown to provide important refuge areas for exploited organisms, allowing some fish species for example to seed adjacent areas that are unprotected—i.e. they act as nursery areas for coastal fish, reef fish in particular. Marine Protected Areas allow representative chunks of coastal ecosystems to remain intact and quite obviously this is desirable for, as we are realizing more and more, no single organism lives in isolation but as an integral part of the environment it lives in.

Richard Paisley, an Adjunct Professor at the Westwater Research Centre at UBC also spoke at the conference and shared the results of research that he has been heading, recently completed for the Law Foundation of British Columbia, on MPA in B.C. (or more correctly the absence of them). Richard made contact with all the main user groups of B.C.'s coastline and after looking at all the issues involved, as well as reviewing the existing legislation, he came up with two main recommendations:

1. Work within existing legislation and policy frameworks to facilitate a clear co-ordinated MPA "vision" while improving federal, provincial, municipal, and first nations co-operation in the establishment and maintenance of MPA.

2. Improve or develop new procedures to significantly aent stakeholder involvement in the establishment and maintenance of MPA.

There is no doubt that Canada, and B.C. in particular, needs marine reserves. The evidence from the rest of the world is overwhelming: marine reserves fulfill an essential role in protecting marine ecosystems and they are used in many countries as viable fisheries management tools as well.

On the weekend of 24/25 July the society will be integrally involved in opening what will essentially be B.C.'s first marine reserve at Whytecliff, north of Vancouver. The society has been working hard with the West Vancouver Municipality and the Vancouver Aquarium to get this venture off the ground and in to the sea, so to speak (members of the society are working right now to help draft legislation that will make the protection enforceable for a limited time at least). Other areas need protection too.

I urge you to become involved in the establishment of marine protected areas in B.C. and you can start by joining the Marine Life Sanctuaries Society of B.C. (Write to P.O.Box 48299, Bentall Centre, Vancouver, B.C., V7X 1A1. Telephone: 929-4131). I did.

A History of Garry Oak Ecosystems—By Briony Penn

1.

Yes Sir James but couldn't we have a few Joffies too?

Zoots like Bonnie Scotland! All that is missing is the BROOM and the Gorse.

GUERRILLI BARRAGE

Fort Victoria was built 1843.

2. Camosun become a place name.

You sold Camosun for what?!?!

3. Land became 'real estate'. Meadows were prime....

BUY YOUR SCOTTISH CASTLE

4. Farmland

California oak grass (Quercus californica)

Spartan Slugs

Poa sp

golf courses.

shooting star (Podophylloids)

Camosun (Quercus)

New playground planned

5. Meadows...

sea blush (Elymus caryocaulis)

Chocolate Lily (Fritillaria lanceolata)

spring gold (Lomatium nuttallianum)

Roemer's Ragwort

Jaws... subdivisions...

Easter Lily (Erythronium oregonum)

6. Parks...

PICNIC LOC!

CHIPPED!

New playground planned

Harvest buddies

Blue-eyed mary (Collinsia parviflora)

Brodiaea coronaria

Flora ubiquitousa

Welcome to Beacon Hill

7.

The Browns

Some have found them useful though the wood proved to be difficult to work.

English Ivy (Hedera helix)

8.

We are a bit nostalgic about them.

Shady Oaks Townhomes

Weeping Willow (Salix spp)

9. But not quite nostalgic enough.

Buy Cypress Get 2 Free

Get your BEST TREE here.

You want Garry Oak Lady??

or YOUR CYPRESS Hedge RHODODENDRUM and TUNIAS!

Art Snapps Nursery

10. Suddenly all the meadows had gone.

Coming soon... A San Francisco CHRISTMAS HILL DEVELOPER

Suddenly all the meadows had gone.

11. Politician (Honus Ignoramus) We have 12 million hectares of rock + snow as parkland - why do you want more??

Global warming

Biodiversity Ecosystems

Species Preservation

Old growth

Wilderness Heritage

...No meadows were set aside for protection.

12. Ecologists did a survey to determine what was left. [This summer]

FORMER GARRY OAK HABITAT

Urban development 99.9%

Ecologists did a survey to determine what was left. [This summer]

13. One of the richest, most diverse plant communities in BC is due to exit at the end of the century.

PARLIAMENT BUILDINGS OPEN 9-5 MON-SAT

Garry oak habitat was here. 6000 BC to 2000 AD

14. A few relics will be left.

Quercus garryana

- Generally old, no young specimens.
- Found only in golf courses and Oak Bay homes
- Very guarded in appearance.
- Not reproducing
- Prone to insect infestations.

A few relics will be left.

15. Biodiversity begins in your backyard.

Biodiversity begins in your backyard.

16. 1. Convert all or part of your garden to garry oak meadow. Let nature do the work. 2. Collect acorns and grow trees. 3. Leave "no room for broom" "gorse is worse". 4. Protect trees from stress. 5. Construction around trees can be fatal. 6. Protect trees in your neighbourhood. 7. Lobby everyone about saving trees + HABITAT. 8. Educate yourself about the habitat. Start w/ walks.

Briony Penn is an instructor with the Environmental Studies Program at the University of Victoria. Briony is also a founding member of the Garry Oak Preservation Society.



Glaucous-winged Gulls and Mew Gulls feeding on Pacific Herring spawn in Parksville area, March, 1993.
(Photo courtesy R.W. Campbell of the Royal British Columbia Museum)