

HALIFAX FIELD NATURALISTS' NEWSLETTER

November '89 to January '90



90

No. 57



Return address:
Halifax Field Naturalists
c/o Nova Scotia Museum
1747 Summer Street
Halifax, NS B3H 3A6

HALIFAX • FIELD • NATURALISTS

- Objectives** To encourage a greater appreciation and understanding of Nova Scotia's natural history, both within the membership of HFN and in the public at large. To represent the interests of naturalists by encouraging the conservation of Nova Scotia's natural resources.
- Meetings** On the first Thursday of every month at 8:00 pm in the auditorium of the Nova Scotia Museum, 1747 Summer Street, Halifax.
- Field Trips** Are held at least once a month, and it is appreciated if those travelling in someone else's car share the cost of the gas.
- Membership** Is open to anyone interested in the natural history of Nova Scotia. Memberships are available at any meeting of the society, or by writing to: Membership Chairman, Halifax Field Naturalists, c/o NS Museum. Please note that new memberships starting from September 1, will include the whole of 1990. Members receive the HFN Newsletter and notices of all meetings, field trips, and special programs. The fees are as follows:

Individual	\$10.00 per year
Family	\$15.00 per year
Supporting	\$20.00 per year

Executive 1989

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Mailing Address Halifax Field Naturalists
c/o Nova Scotia Museum
1747 Summer St., Halifax,
Nova Scotia B3H 3A6

Newsletter

Editor	Ursula Grigg	
Layout/Art Editor	Stephanie Robertson	422-6366
Editorial Staff	Margaret Liston	423-1966
	Nancy MacNearney	457-1532
	John Strong	477-1351
Program Committee	Eleanor & Omar Simonyi (trips)	477-1149
	Pat Sarratt (talks)	429-7685
Conservation Committee	Colin Stewart	466-7168
Bird Atlas Coord. HFN	Clarence Stevens	835-0098
Publicity/Membership	Doug Linzey	445-4943
PSAC	Doug Linzey	445-4943

Shirley van
Nostrand

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Illustrations **Last Issue (No. 56):** Cover — *Glen Loates' Nature Calendar 1986*, Prentice-Hall Publishing, Ont.; p 4 - fungi diagrams from the *"Color Treasury of Mushrooms and Toadstools"*, Crescent Book N336, Orbis Publishing, London 1972; p 5 - moose drawing from *"Conservation"*, Dept. of Lands & Forests, Vol. 12, No. 13, Fall 1988, p 8 - blueberry & labrador tea, and p 9, sheep sorrel and beach pea - *"A Field Guide to Edible Wild Plants, Eastern/Central North America"*, The Peterson Field Guide Series, Houghton Mifflin Company, cedar waxwing from Lisa Bonforte's *"Fifty Favorite Birds Coloring Book"*, Dover Publications, New York, 1982, cartoon by Unger; figures 1 & 2, J. Shirley Cohrs; cartoon from ; p 10 - figures 3, 4, 5, 6, & 7 by J. Shirley Cohrs; cartoon by Unger; p 12 - flora from the previously mentioned Peterson's Field Guide. All other drawings and/or sketches are copyright-free.

This Issue (No. 57): Cover — Pine adapted from Current Inc., winter mink from *The Mammals*, Time/Life Inc.; pp 3 - 7 from the collection of Past Editor Doris Butters; pp 8 & 9 H. Derbyshire; p 10 - flora from collection of . Doris Butters, Northern Gannet adapted from Peterson's *A Field Guide to the Birds East of the Rockies*; pp 10 & 11 from *Native Trees of Canada* by C. Hosie; pp 14 & 15 from and adapted from *Conservation*, Volume 13, No.2, Summer 1989; p 16 from the collection of Doris Butters.

HFN NEWS AND ANNOUNCEMENTS

HFN NEWSLETTER CHANGES

HFN is investigating the use of recycled and/or unbleached paper for our newsletter and stationery. It is time to take another small action in our support of environment conservation since firms that make this kind of paper are now more widely known.

The Paper Source, a Canadian company in Fallbrook, Ontario, has been contacted, and a sample catalogue has been received. Here are a few nuggets from the back page of this catalogue:

"Every tonne of recycled paper produced saves 17 trees."

"Recycled paper requires 50% less energy to produce than virgin paper."

"Recycled paper results in 35% less water pollution and uses 60% less water than the manufacture of virgin paper."

"Manufacturing of recycled paper results in 75% less air pollution."

"Every tonne of recycled paper produced eliminates the need for 3 cubic metres of landfill."

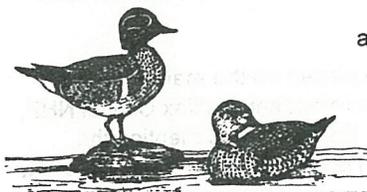
The excellent range of colours and appearance of this paper was a pleasant surprise, but of course at this early stage of general mass-production, it costs twice as much as the paper we use now. S. Robertson, Layout Editor, thinks that the environmental effect of using this paper is worth the extra cost.

This issue of the Halifax Field Naturalists' Newsletter contains reports on the formation of a federation of naturalists' clubs on p 4, and on the recent international, Environment/Economy Conference held at the World Trade & Convention Centre, Oct. 15 - 17, 1989, p 6 & 7.

We hope that Conservation Issues, a new item on p 4 & 5, will appear regularly. It will keep members informed about the specific events that HFN has been following. If there is anything you think the club should be aware of, and possibly express an opinion on, please let the committee know by dropping a line to the Conservation Issues Committee at HFN's address.

The weasel family is featured in this newsletter, a change from the present preoccupation with the Coyote. Barry Sabean's article on the Fisher in Nova Scotia is reprinted on p 13 and notes on the family's tracks appear on p 14.

-Ursula Grigg,
Editor
and Stephanie Robertson
Layout Editor



BLUE-WINGED TEAL
(*Anas discors*)

CLUB POLICY MAILING LIST RELEASES

HFN occasionally receives requests for the use of its mailing list. We do not give any other organisations, or any individuals, permission to use the list, nor do we distribute copies. Members should be aware, however, that we do sometimes give one-time permission to use the list for a specific, stated purpose. This purpose must be one we strongly support; the other organisation must be one whose goals are congenial with our own; and the potential benefit must be significant. In such cases, we provide the other organisation with a set of ready-to-use-mailing labels, and we require an undertaking in writing that they will not be copied. As an example, we once gave the Canadian Nature Federation a set of mailing labels for a major membership drive. To the best of my recollection, three sets of mailing labels have been released to other organisations since I have been involved with the executive from 1983.

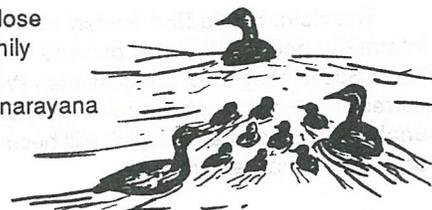
It is the policy of the club to respect the wishes of any member who does not want his name on our mailing list to be used by or released to any other organisation under any circumstances. If its your wish that your name never be used on any mailing outside of HFN, please inform the board in writing. We will then see to it that you are excluded from any set of mailing labels which is produced for use by another group. If you ever have reason to suspect that your wishes in this matter have been ignored, please inform the president.

-Michael Downing,
President



NEW AND RETURNING MEMBERS

David Colville
Frank J. Courmier family
Nancy Dowd
Ralph Fleming
Eileen Hutchinson
Edna Jones
Myra Kennedy
Joyce MacDonald
Robert MacDonald
Anne Mills
Celia & Robert McHose
Mohsin Patwary family
Sara Sheffield
Manjunath Venkatanarayana
Franc Weissenhorn



Common Eider Creche

SPECIAL REPORTS



NOVA SCOTIA NATURE FEDERATION

It looks as if the Halifax Field Naturalist initiative towards a provincial natural history society for Nova Scotia is about to bear fruit.

Members may recall suggestions that such an organisation is needed coming from various quarters over the past several years. It was our dissatisfaction with the new Provincial Act that convinced our board that the time to act was now. A committee of Sifford Pearre, Colin Stewart, and myself has been working towards a provincial federation since last winter.

Over the past year I have contacted between twenty and twenty-five current organisations, used-to-be organisations, and maybe-someday-soon-organisations, by mail, telephone, and face-to-face, trying to drum up support for the idea. The reception was lukewarm at best in some quarters, and the final mailing list was down to about a dozen bona-fide Nova Scotian local natural history oriented societies. But there seemed to be enough clear support to at least call a meeting about it, and this we did. It was held last Sunday, October 22nd, at Acadia University in Wolfville.

The outcome could hardly have been more encouraging. It would seem as if most real lack of interest in the project had been eliminated as the mailing list was pared down. Almost every organisation on our final list of potential members in a Nova Scotia natural history federation sent representation to the meeting. The presence of such a group, and the general atmosphere of willingness and enthusiasm, dispelled any doubts anyone might have had before. The possibility that there might not be enough commitment, among enough societies, to manage a successful organisation, was never even raised.

Last Sunday the following societies agreed to form an organisation which will be called the "Federation of Nova Scotia Naturalists":

Les Amis du Plein Air (Cape Breton Highlands)
Annapolis Field Naturalists
Blomidon Naturalists' Society
Brier Island Ocean Study Group
Chignecto Naturalists' Club
Cole Harbour Heritage Society
Halifax Field Naturalists
Spryfield Long Lake Provincial Park Association
Tusket River Environmental Protection Association



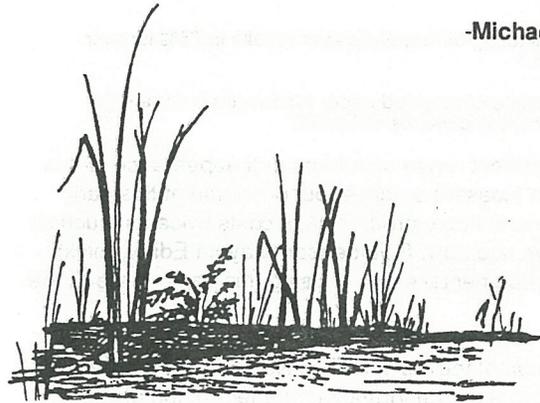
The Nova Scotia Bird Society was represented informally, and will probably become involved eventually. A Nova Scotia chapter of the Canadian Wildflower society, currently going through the formalities of formation, sent unofficial representation which will become official as soon as these formalities are over.

A constitutional committee, composed of one member

each from five of these groups, was formed to write bylaws, attend to the legal details of registration, and handle other business which is background to the formal founding of a new federation. Membership in the FNSN will be open to societies and individuals. Its affairs will be managed by a board of elected and appointed directors. Individual members of the federation and of the federated societies will all vote at general meetings. A president and secretary-treasurer will be elected for two-year terms at the annual general meeting. The mailing address will probably be the Nova Scotia Museum. The central purpose of the federation will be to develop a unified voice, and the capacity for coordinated action, for the naturalist movement in Nova Scotia.

It is intended that all background work will be complete during the winter. The first annual general meeting of the Federation of Nova Scotia Naturalists will be hosted by the Blomidon Naturalists' Society, sometime in late May or early June of 1990. Watch for it!

-Michael Downing
President



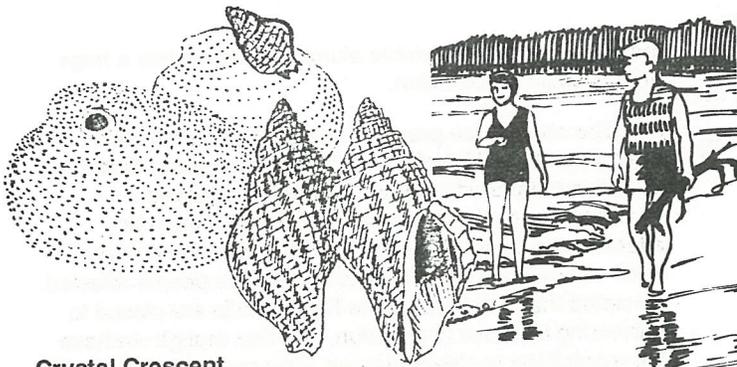
CONSERVATION ISSUES COMMITTEE UPDATE

Halifax Defence Complex.

The Canadian Parks Service recently solicited public input on the future development of the National Historic Park lands in the Metro area. These lands include York Redoubt, parts of McNab's Island, George's Island, and the Martello Tower in Point Pleasant Park, but exclude the Citadel.

HFN made a submission, emphasising that the park adjacent to the historic sites should revert if possible to their natural state at the time of settlement. Additionally, interpretation at the sites should include the natural environment, especially the geographic features, as these were very important in the choice of Halifax Harbour as a defence establishment.

If you would like to be placed on the mailing list for updates, write to The Superintendent, Halifax Citadel NHP, Box 1480 N, Halifax, N.S., B3K 5H7, and mention the mailing list for the Historic Halifax Defence Complex review process.



Crystal Crescent

At the Directors' meeting in October the question was asked whether the two new parking lots at Crystal Crescent Beach (a provincial park near Sambro) were detrimental to the environment. The initial response was "What new parking lots? - Nobody ever tells us anything."

Members of the Conservation Issues Committee went down to the park, had a good look around, and decided there are three initial concerns.

First, were these parking lots needed?



Second, although they are constructed on bedrock well back from the beach systems, very little effort appeared to have been made to limit the damage. The inch or two of soil that has taken the last few thousand years to develop has been stripped not only from the shoulders of the roadway and parking lots but also from areas 10 metres from either.

This reflects a lack of care or knowledge by the contractor and a lack of regulation and supervision by the Department of Lands and Forests. It should be common sense, especially in a park setting, that necessary work should be planned and executed with a minimum impact on adjacent areas.

Third, our last concern involves the increased access for off-road vehicles. This park is already notorious for this problem. Although it could be argued that by providing parking closer to the second and third beaches the need to take vehicles off the road is removed, past experience and fresh tire tracks indicate that the reason for owning these vehicles is to drive them. One motorbike route to the beach is also a pedestrian route; it is so steep that deterioration is inevitable; it will need steps.

Our initial impression is that there is more access for off-road vehicles; we need to monitor and document whether there is in fact increased abuse.

We have requested further information from the Parks Division of Lands and Forests. When it arrives we hope it will answer questions like whether the additional lots were actually needed, or whether they just serve to spread the impact over a wider area?

Eventually all these concerns, with our records, will be forwarded to Lands and Forests. A copy will also be placed on the table at monthly meetings.

The Committee has been favourably impressed with

the development projects in several other parks; we hope to reinforce the principle, that this higher level of care is expected and demanded at all of them.

Conrad's Island

HFN's submission to the legislative review of the Parks Act, and subsequent comments on the changes, are cited by the Canadian Nature Federation as factors affecting the transfer of its land on the Island to the Province, to form part of the Cole Harbour - Lawrencetown Provincial Park. The Parks Division proposes that the Island be maintained as a natural environment site, which is also what CNF wants. The problem is to insure that this is done in a way which is not subject to change in the future.

We have contacted both parties with an offer to act as catalyst in arranging the transfer.

Piping Plovers

Other jurisdictions are experimenting with the protection of Piping Plover eggs by placing cages over the nests. This has apparently proved successful in protecting the eggs from accidental destruction, but is suspected of leading to thefts. We are trying to find out whether these reports are true.

Land protection

In Nova Scotia, if you have a trail designated under the Trails Act across your land, you are protected from certain liabilities in respect of use of that trail. We do not know of any other situations where the landowner receives any compensation for voluntarily restricting the use or development of his land.

In the United States there are lots of procedures by which landowners can restrict the future development of their land and receive financial compensation for doing so.

The Committee is gathering information on the programmes available elsewhere in the hopes that some of the same methods might be useful here. If these were implemented, it should be possible for Nova Scotians who don't want their land further developed to obtain permanent restrictions to that effect without financial loss.

Halifax Harbour Clean-up

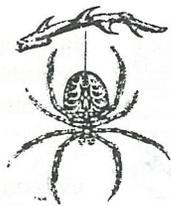
This is more of an environmental issue than a conservation one, but it is so close to home that we are following it carefully. We have asked for various documents; when we have them, we will sit down and consider whether HFN should be making any statements.

-Colin Stewart
Conservation Issues Committee



ENVIRONMENT/ECONOMY CONFERENCE REPORT

World Trade and Convention Centre
OCT. 15-17, 1989



A major thrust of this conference was to initiate the process of drafting a sustainable development strategy for Nova Scotia, and to identify the partnership mechanisms for reaching this goal. The conference workshops were designed to provide some initial guidance to those who will draft this strategy. The sponsors were the NS Salmon Association, National Sea Products, MT&T, Scott Maritimes, Bowater Mersey, Stora Forest Industries, Canadian Pacific Forest Products, Minas Basin Pulp and Paper, Nova Scotia Power Corporation, NS Dept. of the Environment, NS Dept. of Mines & Energy, NS Dept. of Industry, Trade, & Technology, and Environment Canada. HFN was represented by Sifford Pearré and Doug Linzey of the Conservation Issues Committee (Stephanie Robertson stood in for Doug because at the last minute he couldn't attend).

The first day of this conference opened with an encouraging, perceptive address by The Hon. John Leefe, minister of the NS Department of the Environment. He was followed by Robbie Shaw of National Sea Products, who was understandably galvanised by the recent decline of the fish stocks. The morning's keynote address, by W.H. Lindner of the Centre for Our Common Future, in Geneva, emphasized that the perceived key to solving the global problems was "sustainable development", a term popularised by the Brundtland Commission report **Our Common Future**, and that this was to be the central theme of the conference. He was followed by Beatrice Olivastri of the National Survival Institute, Ottawa, who moved the context of sustainable development to Canada.

After the morning break, the meeting got down to more specifics. A panel discussion addressed the relationship of sustainable development to Nova Scotia, with speakers Jim Harrison of the Nova Scotia Environmental Control Council, mayor John Savage, Dartmouth, and Ellen McLean, of the Associated Country-Women of the World. To me, Jim Harrison's more important points were the need to preserve agricultural land; the question of reserving fossil fuels for chemical production; the better utilisation of waste heat; and the need for more public transportation (rather than the federal government's determination to reduce it). He felt that the government must go from a "react & cure" mentality to one of "anticipate & prevent", and most importantly, that we really must obtain a sustainable *environment* rather than sustainable *development*.

John Savage confessed that he was pessimistic about the environment. He noted that vehicles consumed 50% of fuel use, and that the population of them is expected to be a billion by the year 2025. He too emphasized the need for public transport, calling present priorities completely wrong and the VIA Rail cuts "environmental madness". He felt that the direction needed was toward a concept of "healthy communities". Dr. McLean spoke about education and about research. She was especially concerned with our poor performance relative to the rest of the world on recycling and reuse, noting that we recycle less than half of

the economically recyclable aluminum, which has a huge energy cost of production.

The conference provided us with a pleasant lunch, after which Ray Côté of the Dalhousie University School of Environmental Studies gave the afternoon keynote address. He emphasized that development must be effective and acceptable, involve no loss of species, be multi-use, minimize waste, and involve the people affected. He noted that 160 harbours in Nova Scotia are closed to harvesting because of pollution, and that though we have the regulations to clean them up, they are not enforced. He suggested some options for reducing local emissions, many of which could be made to pay for themselves. He also stated that, while we seem to have relatively smaller pollution problems compared to more densely populated areas, on a per capita basis, Nova Scotia's CO₂ production is among the world's highest. Overall, he felt that we need to integrate environmental education with all of the school curricula, and that Nova Scotia might become a centre for developing environmentally sound economics which the third world would want to copy.

After the address, the group broke up into workshops of about twenty people each, charged with discussing sustainable development strategies and suggesting examples. My group was convened by Lois Corbett of Ecology Action Centre. It represented people from a broad spectrum of backgrounds, and all participants gave thoughtful presentations. It was not clear whether we were supposed to suggest remedial and preventive things that could be done or only choose from successful steps that already been taken; our group opted for the first and made a longer list. Each workshop reported to the plenary session, chaired by Douglas Myers of Henson College, Dalhousie University. Among the suggestions were waste-heat aquaculture, city composting, recycling, and structuring of industrial parks so that industries could utilise each other's waste or energy. Among the topics noted as controversial was reforestation; current practices produce nonspecific, even-aged stands which are vulnerable to pests and diseases and provide little of the diversity needed by wildlife. The sessions concluded there, but subsequently, non-profit "NGO's" (non-governmental organisations) met with representatives of Environment Canada to hear environmental complaints and receive remedial suggestions.

Monday evening featured a reception and dinner at which The Hon. John Buchanan spoke, but no HFN reporter was present.

-Sifford Pearré
Conservation Issues Committee

The Session III keynote address for Tuesday morning, by Roy Aitken, Exec. VP of INCO, was "Sustainable Development and the Bottom Line". In Mr. Aitken's view, the attitude NIMBY ("not in my backyard") was one of the main problems of dealing with the waste products of industrialization and business.

Two case studies accompanied the keynote address. The first, "The role of clean coal technology in achieving sustainable development", was given by Dr. Phil Read of CANMET. Dr. Read presented the facts about cleaner and

more efficient techniques for burning coal, all feasible for Nova Scotia. (By the year 3000 the coal will have run out, but it will be good for another 200 - 300 years.) Only one third of the possible useful energy is obtained by burning coal; and when it burns, the pollutants fly-ash and other particulate matter, sulphur and carbon dioxides, and heavy metals are produced. With appropriate technology, all these can be removed or reduced except for the heavy metals. The Conversion of Coal to Liquids method was recommended by Mr. Read as being the best and most feasible economic and environmental combination.

The second case study, "Recycling as a Profession", was given by Archie Fader, Society of Nova Scotia and Prince Edward Island Bottle Dealers and Recyclers. He pointed out that this new entrepreneurial enterprise needs the support of all governments. There are 50 landfill sites in Nova Scotia to serve 900,000 people. 73% of present landfill waste is recyclable; 25% is solid waste. As the population grows, landfill sites will become scarcer. Mr. Fader recommended that the Department of Education start teaching the primary grades about recycling.

The delegates then broke up into their 8 workshop groups, to produce practical environmental improvement mechanisms under the aegis of "Constraints and Opportunities: Conservation efforts and sustainable practice of Individuals, Municipalities, Small business, Large Industry, and Government Agencies". Facilitator Murray Coolican, National Sea Products Ltd., tried more or less successfully to keep the delegates on track, as some members articulately expressed their frustration over the slow responses of government and business to what some thought was an emergency issue - the rapidly declining quality of our environment. I think the central problem distracting the workshop was the very different subconscious beliefs of the participants as to what constitutes an emergency — and the fact that the democratic process being used for these immediate dangers might be too slow. (Mr. Coolican suggested another Royal Commission to look into the matter.) Among practical suggestions put forth were: further development of environmental monitoring; advertising of preventive measures at a local level; teaching the effects of certain purchases on the environment in schools; elimination of government loans to polluting businesses, the raising of their taxes, and the lowering of insurance rates for non-polluting industries; more fundamental changes such as banning clear-cutting, and the substitution of the word "ownership" in legal documents when land is purchased to the word "stewardship"; the setting up of a Nova Scotian Business-Waste-Exchange System such as exists in Ontario; the use of more effective advertising of environmental problems; provision of local specific waste-product boxes for recyclable waste; and the public distribution of regular, household environmental protection hints by Environment Canada.

The guest speaker during luncheon was Mr. V.E. Tretjakov, Deputy Director General, Department of Economics and Rational Uses of Natural Resources, State Committee for Environmental Protection, USSR. Using a translator, Mr. Tretjakov reiterated what many workshop delegates were stating — that ecological concerns are not taken into account by government and business. In Russia,

this is due to lack of integration of economy and ecology; too much emphasis on industry; wasteful production techniques; industrial indifference; and lack of good land-use practices. Mr. Tretjakov's department has set up a group to implement optimal environmental, industrial, business, and agricultural practices in Russia based on the following principles: unity of economy and ecology; top-priority status for the solution of ecological problems; better resource management; the creation of a system of economic key-factors; a fund for conservation that will be used for rewarding good industrial practices; and the limiting of resource consumption. A 5-year plan to limit pollution discharge and resource consumption and to study monitoring of the environment has begun.

Susan Holtz, Vice-Chair of the National Round Table, gave the Keynote Address for Session IV. Ms. Holtz gave an excellent presentation titled "The National Task Force Exercise: How Did it Coalesce?" which discussed The National Task Force Report (the Green Report) and its 40 recommendations. This report came to the conclusion that the cost of conservation might be too high (this delegate thinks that the cost of lack of conservation will be higher), and that government and politicians are the biggest stumbling blocks to change. Case Study #1 for this address, "Sustainable development and the Dartmouth Lakes: 18 years with the advisory board" was presented by Audrey Manzer, chairman of the Dartmouth Lakes Advisory Board. Ms. Manzer gave a glowing report of the hard, long road to building a broad and implementable system of protection for the lakes and the excellent cooperation and strong support the Board always received from the City of Dartmouth. She stated that two of the strategies used to achieve high and continual programme success are to send educational representatives into the Dartmouth schools, and to utilise the strengths and activities of Environment week. The second case study, "Barbs and Bars: A river enhancement project in Cumberland County", by Katharine Rice, Director of Universal Atlantic, narrated her story of the successful integration of an inmate rehabilitation programme with the cleaning up and monitoring of a salmon river in Nova Scotia. She advised business and industry to be innovative and creative in their environmental improvement activities. Case Study #3, the General Discussion, Wrap-up Panel, and Closing Remarks could not be attended by this delegate.

The following statement about the conference's central issues is extracted from one of the "table pamphlets." It is entitled "Sustainable Development: A Policy for the Human-earth Relationship", from **Foundations for an Earth Age** (forthcoming) by Lorna Greene of the Margaree Valley, NS.

"...We have been living off the capital of the Earth; we need to learn to live off the interest." ... "I propose four general principles for the human-Earth interaction by means of which we can all 'think globally, act locally'. ... We must cut our numbers; ... we have to clean up our act; ... we have to simplify our lifestyles; ... (and) we need to restore and resurrect the Earth." ... "This is a task which requires government leadership and funding, and local initiative at all levels, to make both our personal and corporate lifestyles *ecologically sound*."

-Stephanie Robertson for Doug Linzey,
Conservation Issues Committee



SPECIAL ARTICLES

WILL BOTH BIG ICECAPS MELT SIMULTANEOUSLY? PROBABLY NOT

Global warming from the greenhouse effect may melt polar icecaps, causing the sea level to rise. But Dr. Roy Koerner, a research scientist with the Geological Survey of Canada, suggests only the Greenland icecap would melt fully and not the West Antarctic icecap.

Melting of either icecap - the two largest in the world - would cause sea level to rise by six metres. If both melted, it would rise by 12 metres. Such increases would cause catastrophic flooding in coastal regions throughout the world.

Some scientists were predicting that both icecaps could melt in a warmer climate. But by studying ice cores from the bottom of the Greenland icecap, Koerner has found several lines of evidence that during the last warm interglacial period, 100,000 years ago, the Greenland icecap melted entirely. Since it is known that the sea level then was only six metres higher than it is now, Koerner's research could be proof that the West Antarctic icecap did not melt then and may therefore be more stable than scientists thought.

Unlike the Greenland icecap, which is almost all on land, the West Antarctic ice extends out over the sea and is supported by several islands. Some scientists have theorised that a small rise in sea level could lift the ice sheet, causing it to break up into the ocean and rapidly melt. But since that doesn't appear to have happened during the last warm interglacial period, Koerner thinks it is unlikely to do so now, despite rising global temperatures.

Koerner found several indications that the Greenland icecap had melted completely during the last interglacial. First, the type and size of dirt and pebbles in ice cores taken from two sites in Greenland indicate that the present ice formed on bedrock at the end of the interglacial. If the ice had formed on an existing icecap, the only dirt found in it would have to have been blown there. But pebbles in the cores were too heavy to have been carried by the wind. It is far more likely that they were incorporated into the ice as it formed on the bedrock.

Koerner's second line of evidence rests on oxygen isotopes in the ice. (An isotope is a slightly different form of the oxygen molecule.) The relative amounts of different oxygen isotopes in ice depend on the temperature at which the ice formed. At the bottom of the Greenland cores, the isotopes indicate that the ice formed under relatively warm conditions. This suggests the ice formed from snow that fell at ground level, rather than on to an icecap which would have been at a much higher elevation and therefore, at a lower temperature.

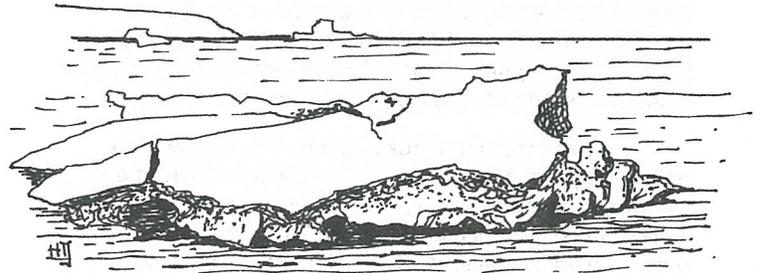
Third, the levels of carbon dioxide and the number of bubbles in the ice indicate that it formed by freezing and melting several times, as when an icecap first forms. "Any one of these arguments is weak, but together they convince me that there was no icecap on Greenland 100,000 ago,"

says Koerner.

Koerner says that few serious scientists would now agree with the popular 'Doomsday' theory that the West Antarctic icecap could suddenly break up and melt, though some might say that in 100 years, with increasing temperatures, it could become a visible concern.

But he maintains that if the Antarctic ice sheet didn't disintegrate during the last warm period, it would be unlikely to do so now if warming causes the sea level to rise again.

-Lorraine Brown
Canadian Science News



HIGHWAY SALT SPRAY HARMS PLANTS

Cars that travel some of Canada's busiest highways in winter may spray salt further than 50 metres on to either side of the road, according to a new survey.

Scientists have known for some time that road salt does considerable damage to animal and plant life near the highways.

Not only does the salty spray harm the plants that grow beside the road but salty water runs off and pollutes streams and ponds where it has been found to reduce the life expectancy of animals living there. Salty water also kills trees that soak up the brine which seeps into the soil.

The new study, conducted by Edward McBean of the University of Waterloo in Ontario and Sabah Al-Nassari of Liverpool University in England, measured exactly how far salt is sprayed by passing cars.

In a survey of Canadian roads, the scientists found that on the roads with the slowest speed limit, salt is sprayed 29 metres from the edge of the road, with most of it concentrated within 2 metres.

At the other end of the speed range - 100 kilometres per hour - salt was found 37 metres from the road, with most of it concentrated within 10 metres.

The scientists conclude that on highways where drivers regularly break the speed limit, salt is sprayed 50 metres into the surrounding area on either side of the road.

-Adapted from Canadian Science News

INVENTION IS REALLY SLICK AS A WHISTLE.

A Useful Addition to a Hiker's Safety kit

At last, the worry has gone out of whistling.

For years, sports coaches and referees have griped about the drawbacks of the old pea whistle. For one thing, it often was not loud enough to be heard over the roar of a large crowd (or by a search party in the forest - Ed.). Also, sometimes the pea would jam inside, virtually silencing the whistle; other times, it would shoot right out of the casing. Dirt or water caused it to clog, again reducing the whistle's efficiency.

(The purpose of the pea is to provide the trill, or warbling effect, of the whistle.)

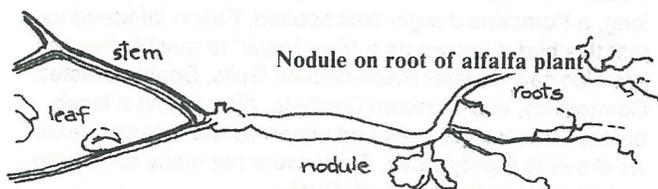
But now there's the Fox 40, a pea-less whistle that's blowing away the old model. In only a short time, the Fox 40 has been adopted by many sports organisations, including the Seoul Olympics Committee. Police forces, armed services, Scouts and Guides have shown interest in it, and it is on sale internationally.

The Fox 40 was designed by Ron Foxcroft, a native of Burlington, Ontario, full-time trucker and part-time basketball referee. Years of frustration and embarrassment with traditional types prompted Foxcroft to reinvent the whistle, even though he has no background in design or manufacturing. He enlisted the aid of Oakville design engineer Charles Shepherd.

Four years and 14 prototypes later, the Fox 40 was born. This is a one-piece unit separated into three chambers with two holes on top and one on the bottom. The chambers are all tuned to different notes, and 'sound' simultaneously to produce a harmonised tone with a trill.

There is also a smaller, quieter mini-Fox, that's best suited for gym teachers.

-Adapted from Canadian Science News



SOIL BACTERIA HAVE A SECOND SYSTEM FOR FIXING NITROGEN

A Canadian biochemist, in collaboration with researchers in England, has found that there is more than one way in which bacteria take up nitrogen from the air and water in soil, and make it available to plants. Their research means biologists and agronomists may have to revise their ideas about what a plant needs in soil.

The bacteria's accumulation of nitrogen, known as nitrogen fixation, plays an important role in the growth of many crop plants.

Dr. Richard W. Millen, of Agriculture Canada, and his British colleagues showed that bacteria have a second, genetically-controlled, system for nitrogen fixation. They can 'switch' to this system if the raw material for the first system is not available.

Nitrogen-fixing bacteria live in a mutually beneficial, or symbiotic, relationship with certain plants called legumes, which include many crop plants such as soybeans, peas, and alfalfa. Legumes have nodules on their roots where the bacteria live.

In exchange for protection and nutrients, the bacteria take nitrogen from the surrounding and 'fix' it; that is, turn it into a form which the plant can use. Legumes therefore require less nitrogen fertilizer than other plants. They also enrich the soil with nitrogen.

Bacteria fix nitrogen by using an enzyme called nitrogenase. Until recently scientists thought that there was only one form of nitrogenase, which the bacteria made using the metal molybdenum. They knew that in the absence of molybdenum the bacteria could use vanadium, another metal, instead.

But the Canadian-British team has discovered that the bacteria do not just use vanadium as a back-up when molybdenum is in short supply. Instead, they have a whole separate vanadium-nitrogenase system, controlled by a separate set of genes. Drs. Robert L. Robson and Robert R. Eady, of the University of Sussex, found conclusive evidence of the vanadium system. They placed bacteria in a medium that contained ions of the metal tungsten. Tungsten ions will prevent bacteria from taking up molybdenum, but not vanadium. So if bacteria in a tungsten medium can fix nitrogen, they are doing so with the vanadium-nitrogenase system.

Tungsten is usually toxic to bacteria, but a few bacteria could tolerate it. Dr. Robson then gave these bacteria vanadium, and they immediately began to fix nitrogen.

Later, Dr. Miller collaborated with the British scientists to purify and analyse the vanadium-based enzyme from bacteria. Once they had determined that it was vanadium and not molybdenum, they had final proof that a vanadium-nitrogenase system really did exist.

This research was done with a bacterium known as *Azotobacter*. Dr. Miller now wants to find out whether *Rhizobium*, an important group of bacteria for nitrogen fixation in Canadian crops, also use a vanadium-based system.

"If we find that *Rhizobium* also has a vanadium-based system, then assumptions we made about how much molybdenum bacteria is needed in the soil may be all wrong," he said. "When thinking about the mineral needs of plants, we'll have to start thinking about vanadium too."

-Lorraine Brown
Canadian Science News

FIELD TRIPS

RAINBOW HAVEN

DATE: August 19, 1989
PLACE: Rainbow Haven Beach
WEATHER: Sunny and warm
PARTICIPANTS: 18
BIRDS: 21 species
LEADER: Mike Crowell, plant ecologist



Sea-Milkwort

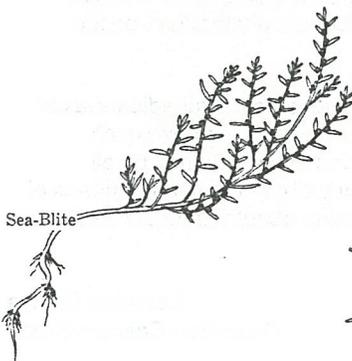
Eighteen Halifax Field Naturalists met at 10 am with our leader, Mike Crowell, in search of shore and marsh birds and other specimens of interest to us. We started our hike down the boardwalk noting beach grasses and plants as we approached the seashore. Walking along the beach, we passed many volleyball games, sun bathers etc., but somehow knew we were going to have a more fulfilling day. We started spotting birds almost immediately, the first being a Savannah Sparrow. Through the course of the day with field guides and Mike's expertise, we managed to see and identify 20 others; Herring Gull, Common Loon, Great Blue Heron, Double-crested Cormorant, American Goldfinch, Least Sandpiper, Semipalmated Plover, Semipalmated Sandpiper, Tern, Black-bellied Plover, Greater Yellowlegs, Osprey, Short-billed Dowitcher, Ruddy Turnstone, Sharp-tailed Sparrow, Mourning Dove, Black-backed Gull, Ring-billed Gull, White-rumped Sandpiper and Willet.

Some of the birds seemed to actually pause and pose for us.

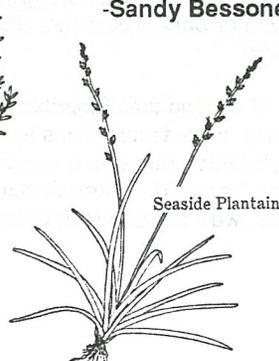
We also noted much plant life found on the seashore, the more prominent species being: Beach Pea, Sea Rocket, Seaside Goldenrod, Orach, Sea-blight, Sea Milkwort, Seaside Plantain, Sand Spurrey, Samphire, Seaside Aster, Silverweed, Sea Lavender, Dusty Miller, Marsh Skullcap, and Scotch Lovage.

After a leisurely lunch, the few of us who remained for the afternoon walked north to the marsh area, where we observed more of the birds and yet more grasses and plants. We also managed to find some raspberries, which we picked for a tasty treat.

Around 4 pm, we parted for home, having spent a most successful day, thanks to Mike who was very patient and obliging to all questioners about the plant and animal life we encountered.

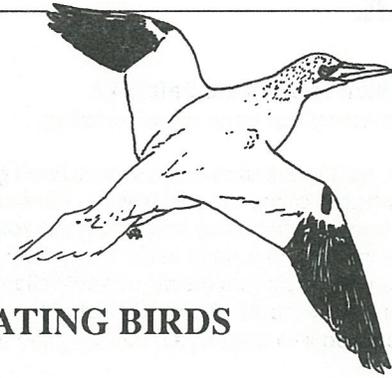


Sea-Blite



Seaside Plantain

-Sandy Bessonette



Northern Gannet

MIGRATING BIRDS

DATE: September 23, 1989
PLACE: Hartlen Point, Chebucto Head and Sandy Cove
WEATHER: Extremely windy and humid (Hurricane Hugo)
PARTICIPANTS: 4
BIRDS: 16 species
LEADER: Fulton Lavender

Four Halifax Field Naturalists met at 8:00 am at the Nova Scotia Museum for the purpose of tracking migratory birds. Our first encounter with nature was at the Museum parking lot where we observed a large grey squirrel.

We then drove to Hartlen Point where we were joined briefly by two members of the Bird Society, and soon we started spotting small numbers of birds. We were able to identify Bonaparte's Gull, Lesser Golden-Plover, Sanderling, Savannah Sparrow, Semi-palmated Plover, Semi-palmated Sandpiper, White-rumped Sandpiper, Dunlin (Red-backed Sandpiper), Ring-billed Gull, Ruddy Turnstone, Double-crested Cormorant, Black Duck and Northern Gannet. We were also most fortunate in seeing a Merlin pursuing a sparrow. We could see Lawlor's Island nearby, and Fulton informed us that Blue Herons nest there in April. The fields in the area were alive with late-blooming wildflowers, such as Blue Asters, Fall Dandelions, Butter and Eggs, Wild Radish, Common Sowthistle, and Japanese Knotweed.

We then decided to go across the harbour to Chebucto Head. The wind was even more of a problem here but before long, a Pomarine Jaeger was spotted. Fulton informed us that this bird is known as a "Sea-Hawk" to most fishermen. We also saw Greater Black-backed Gulls, Double-crested Cormorants, and Northern Gannets. After taking a lunch break, when we sat back and observed the stormy ocean, we drove to Sandy Cove. There were not many birds here except more gulls and Black Ducks.

It was at this time we began to identify some ground covers such as Bearberry, Crowberry, and Juniper. We also saw some Meadow Mushrooms (*Agaricus campestris*) and a Katydid.

We then decided to call it a day, since at this point we were overcome by the winds. Despite the weather it was a very informative and enjoyable day, thanks to our guide.

-Sandy Bessonette.



Pine

THE FOREST FLOOR IN CHIGNECTO AND FENWICK

DATE: 26 August 1989

PLACES: Chignecto Game Sanctuary and Fenwick Provincial Park, Cumberland County

WEATHER: Sunny, but cool in the forest

PARTICIPANTS: 9 adults, 1 child (Peter Simonyl)

GUIDE and INSTRUCTOR: Bob Ogilvie, Curator of Special Places.

After meeting at the designated parking lot in Parrsboro, with Bob Ogilvie as our guide we proceeded to West Brook, and from there entered the Chignecto Sanctuary. With little effort, one could imagine trying to find one's way on a dusty safari. However, we didn't get lost, and parked our cars beside a majestic stand of Red Pine set in an undulating sea of green Bracken. We disembarked and followed Bob into the forest, after he had attached his trusty biodegradable lifeline to a bush, paying it out until we had stepped off so many metres. Bob had a compass as well so that we wouldn't lose our way.

After being instructed in the various methods of examining the forest floor and measuring the trees it supported, we were divided into three teams to get on with the project. Each of us eagerly awaited our turns to use the methods we had learned.

The Saturday trek was to the Chignecto Candidate Nature Reserve, a red pine stand straddling the northeast boundary of the Chignecto Game Sanctuary, Cumberland County. The site is made up of several small stands with varying components of red pine. The objective was to document at least two of the stands within the candidate reserve.

Three different methods were used to document the forest, each using the same 50-metre transect-established tape measure. Three groups undertook Point Quarter, Line Intercept, and Plot Sampling surveys. These involved a series of measurements and tallies of particular features of the vegetation.

The Point Quarter survey involved documenting the

diameter, species and distance — from the 10-, 20-, 30-, 40- and 50-metre points — of living trees in the four quadrants found about these points. Twenty trees were measured in each stand. The subsequent measurements were then plugged into the following formulae:

1. **Basal Area:** the total for each species, derived from the recorded diameters.
2. **Average Dominance** = $\frac{\text{Basal Area of each species}}{\text{Number of each species}} \times 100$
3. **Relative Density** = $\frac{\text{Number of each species}}{\text{Total Number of Trees}} \times 100$
4. **Species Dens.** = Relative Density x Total Density of all species
5. **Dominance** = Average Dominance of Species x Species Density
6. **Relative Dominance** = $\frac{\text{Species Dominance}}{\text{Total Dominance}} \times 100$
7. **Frequency** = $\frac{\text{Number of points in which a species is found}}{\text{Total number of points}}$
8. **Relative Frequency** = $\frac{\text{Frequency value for a species}}{\text{Total Frequency for all species}} \times 100$
9. **Importance Value** = Relative Density + Relative Dominance + Relative Frequency

The Line Intercept was used to quantify the ground cover at 2-metre intervals along the transect. A metre stick placed perpendicular to the ground at these points touches the ground cover on the forest floor and at the shrub layer — whatever was directly touched was documented. This gave a rough quantitative description of the ground cover of the stand.

The Plot Sampling method involved measuring the number of trees and stumps within a 3-metre radius of 5 different points along the transect. A length of flagging tape was the only equipment needed, and simple counting of the living trees, dead trees, and stumps within the radius gave good information on the density and condition of the forest.

In the case of Chignecto, two stands were surveyed. In the first, there were 4 times as many red spruce as red pine, with the red pine being almost 3 times as large in diameter. The ground vegetation was principally needles, moss, woody debris, and lichens, with some blueberry, bracken, and rhododendron in the shrub layer. A large number of dead trees and stumps were evident in the stand.



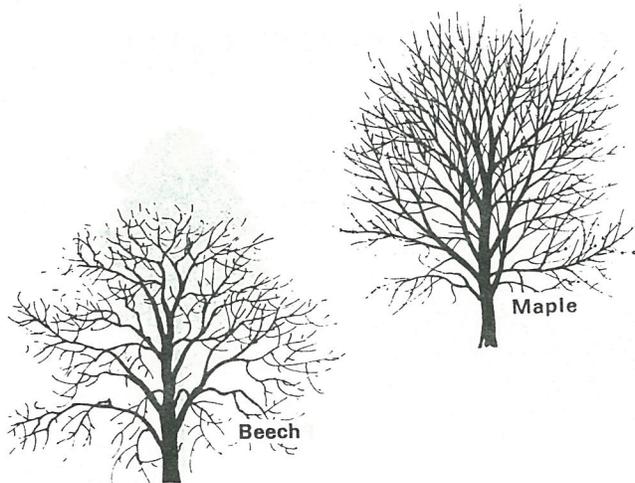
The red pine were much more dominant in the second stand, though roughly the same size. Red spruce had disappeared entirely, while a few white pine and a solitary small white birch were measured. Bunchberry was abundant in this stand and its ground vegetation had more herbaceous plants, but moss and lichens were absent. There was a greater density of living trees than in stand 1, and a far greater number of stumps.

After the first day, half the group found a camp ground near Amherst on which to pitch their tents, and the rest found other accommodations. Having had a good night's rest, we met again at 9:00 am.

The site of Sunday's visit was Fenwick Provincial Picnic Park, located south of Amherst on Highway 2. Three surveys were undertaken, the first two in hardwood areas, the other in a mixed wood.

The most abundant species in Stand 1 was beech, with three large sugar maple and some smaller yellow birch and red maple. The total density of trees was only slightly less than Chignecto Stand 2, but the average tree size was less than half. On the forest floor, different species made an appearance and needle litter was absent, both as would be expected. Sapling growth was relatively abundant. No standing dead trees were tallied and only one stump was recorded.

The second stand surveyed here was on the east side of Highway 2. The transect crossed a narrow dirt lane at one point, which served to skew the data. Once again, beech dominated the stand in number of individuals present, but in this case the sugar maple were massive, averaging over 5 times the size of the beech. The beech themselves were considerably larger on average than those in stand 1. The large maple dominated the stand, but the abundant beech were still the most important trees in the stand. Dense sapling growth was characteristic of this area, with abundant leaf litter and considerable woody debris also in evidence. Again, there was a lack of dead trees and stumps in the hardwood forest and wide spacing of living trees.



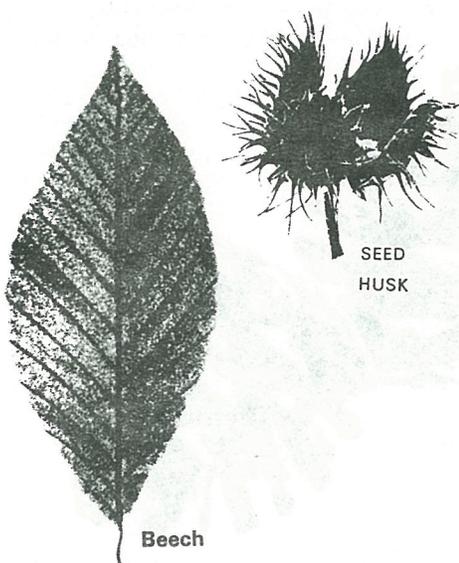
The final stand was located directly behind the picnic park, and was the only mixed stand that was visited. The dominant species, both in terms of density and size, was balsam fir, with a numerically equivalent number of smaller deciduous trees. This stand was obviously in a transition stage, and the short-lived balsam fir will be replaced by the smaller deciduous trees once the canopy opens. This stand is the product of disturbance, possibly a clear-cut. The time of the cutting could be approximated by coring the larger fir trees, but a rough guess would be in the order of 75 - 100 years. The ground vegetation was quite varied, with little sapling growth but a variety of seedlings. The abundance of woody debris was indicative of the degeneration of the balsam fir.

The information gathering exercises at Chignecto and Fenwick candidate nature reserves gave participants an opportunity to use their skills to describe the forest in a new way - quantitatively as opposed to qualitatively. The work did not provide a definitive description of the forest, as many more points needed to be sampled for statistical significance. However, the exercise did help us to recognize and remember aspects that normally escape us during a simple stroll through the forest. The simple analysis that was done gives us a basis for speculation on the ecology of the forest - the relationships between tree cover and ground vegetation, associations of tree species, and the distribution of dead trees within different forest types.

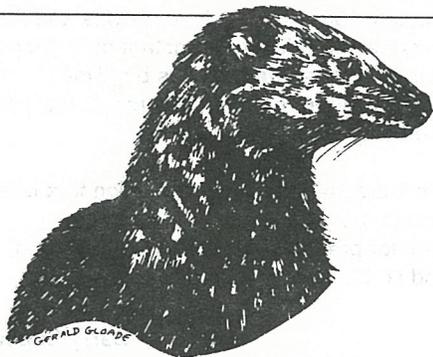
This trip provided a great deal of useful information for the Nova Scotia Museum, which needs more of this type of information as it develops a system of ecological reserves for the Province. In the two rewarding days we spent in Chignecto and Fenwick, we all had an opportunity to contribute to a very important ecological survey. The enthusiasm of the participants was encouraging, and we hope that the Halifax Field Naturalists and other groups in the province will adopt a programme to help find and document other areas.

This special programme needs your assistance!

**-Bob Ogilvie,
Curator Special Places,
Nova Scotia Museum
and Helen Smith,
HFN**



NATURAL HISTORY



FISHERS IN NOVA SCOTIA

Fishers are valuable furbearers, well known for their ability to prey on porcupines. It was a considerable blow to our province when these animals started to disappear from our forests. In 1867, J. Gilpin wrote in the **Proceedings and Transactions of the Nova Scotia Institute of Science**: "Never very plenty, they [fishers] are rapidly becoming extinct in our province; from 150 to 200 are the utmost now taken yearly." Our last specimen was reported to have been taken in 1922.

What caused the fisher's disappearance? Unregulated trapping, combined with habitat changes resulting from logging, forest fires and human settlement, are generally blamed. This was a familiar story in all of southern Canada. By 1900 the fisher population had been greatly reduced throughout most of its continent-wide range.

Protective legislation, habitat improvements and fisher re-introductions have resulted in the restoration of the fisher throughout most of its historic range.

In Nova Scotia, 12 ranch-raised fishers were released into the Tobetic Game Sanctuary in 1947 and 1948. In a second re-introduction from 1963 to 1966, 92 wild fishers from Maine were released into the eastern mainland portion of the province. Both introductions were successful. But although fishers can be found scattered throughout mainland Nova Scotia, populations remain low.

The fisher, (*Martes pennanti*), does not, as the name implies, eat fish. The name likely originates from the animal's similarity to the European polecat, which was sometimes called 'fichet' or 'fiche'.

Fishers — like mink, marten and skunk — are members of the weasel family. They have a long slender body and a somewhat bushy tail about half that long. Their long supple neck tapers to a pointed face with short rounded ears and black, beady eyes. The legs are short and sturdy and the feet are equipped with sharp claws. When reflected in strong light at night, their eyes appear as bright spots of pale green. Males average about 62 cm (24 in.) long (excluding tail) and weigh about 4.8 kg (10.6 lb.). Females are 51 cm. (20 in.) long and weigh only half as much. The largest fisher on record was a male from Maine which tipped the scales at over 9 kg (20 lb.).

While the fur on the tail, legs and hindquarters is usually black, the shoulders and head are often grizzled gold and silver - particularly in the males. The fur has stiff glossy guard hairs and a silky undercoat. The female's coat is normally blacker and less coarse than the male's and more valuable in the fur industry.

Although strong, agile climbers, fishers obtain most of their food on the ground, feeding primarily on snowshoe hare, porcupine, deer (carrion) and small mammals. They are capable of killing a small fawn, but this would be a rare occurrence. Other less common food sources include birds, fruits, nuts and berries.

Fishers are the only predators which regularly prey on porcupines. This has made them popular with foresters and woodlot owners. Several researchers have noted decreases in porcupine numbers, probably as a result of the re-introductions.

In the winter a single porcupine kill can sustain a male fisher for 20 days. Fishers kill porcupines by repeated attacks to the unquilled face area. This process may take half an hour or more. The attackers do not always escape unscathed; many have been found with quills lodged in head, neck and chest. These quills rarely cause any problems; the lack of infection may result from a mild antibiotic found in the quills.

Mixed forests with a wide diversity of tree species make good fisher habitat. Although abundance of prey is important, they require large areas of continuous overhead cover and suitable denning sites such as hollow trees. Hollow logs, brushpiles or rockpiles also serve as temporary shelters and resting places.

Fishers are normally solitary, each occupying a home range of around 20 square kilometres (8 square miles) for males and 10 square kilometres (4 square miles) for females. Although territories between the sexes may overlap, apparently only one animal occupies each territory.

Female fishers first breed at 1 year, but because of delayed implantation do not produce their first litters until they are 2. Breeding normally takes place in late March or April, soon after the birth of the current year's litter. From 1 - 6 (typically 3) kits are born, usually in a cavity with a small opening high in a large tree.

The young are born blind and helpless but by 8 weeks of age they are mobile enough to be moved to a ground den. Though they may begin eating solid food after 9 weeks, nursing continues for 16 weeks. The young will remain with the female until late summer or early fall, when the family unit breaks up. The male takes no part in caring for the young.

Seldom seen by humans — even when their numbers are high — fishers are relatively easy to trap because they are quite curious and readily come to bait. It is this

combined with habitat loss, that has resulted in past population reduction.

Fishers have been valuable furbearers during the entire history of the fur trade in North America. At times the fur has commanded extremely high prices. An Ontario trapper reported that during the 1920s one good fisher pelt could buy enough food to do 3 men for the entire trapping season.

When the fisher became scarce, trappers were willing to go to extremes to obtain one. One method, called 'walking down a fisher' could involve a chase of several days.

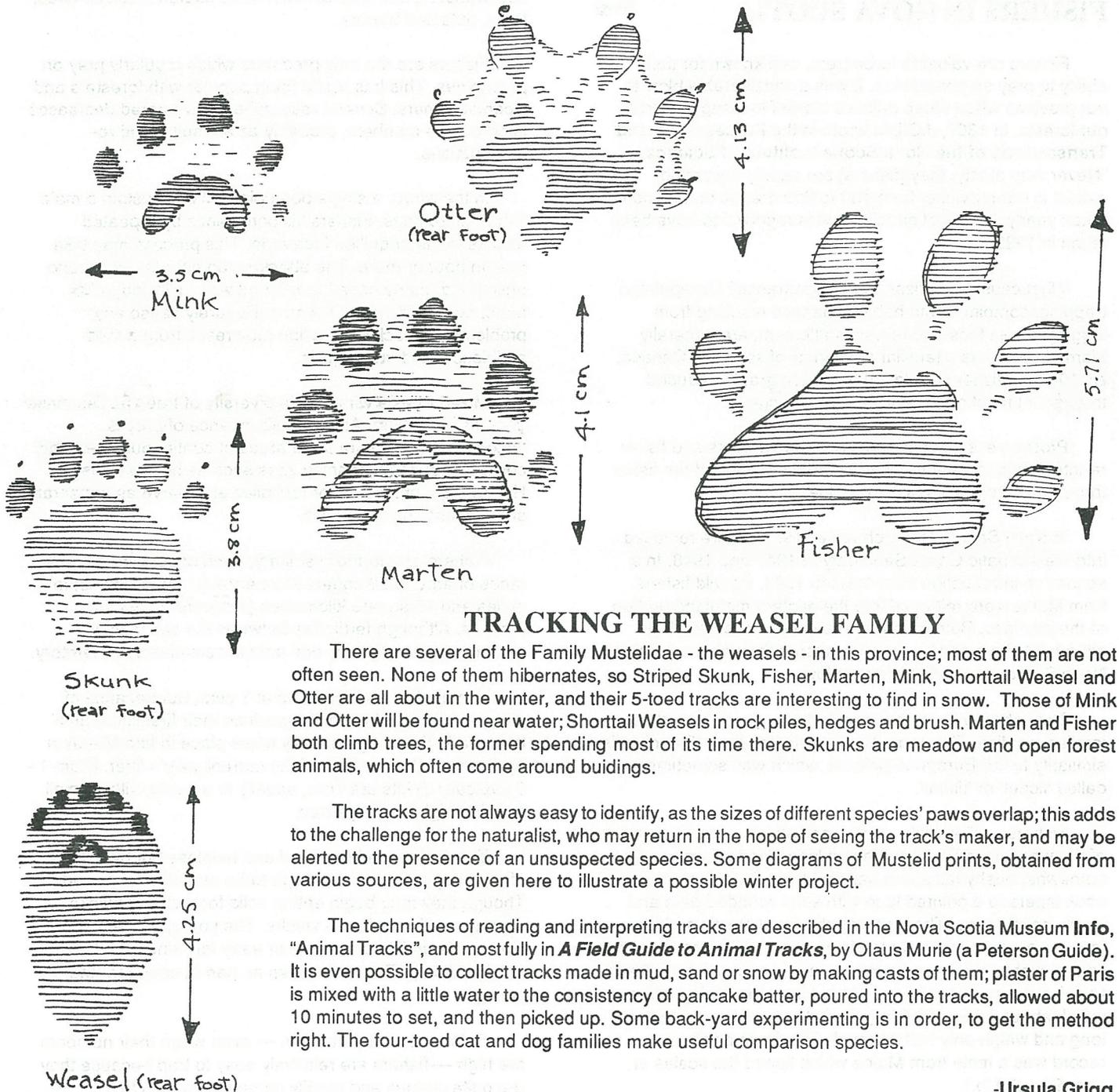
Today Nova Scotia has a fairly stable, though low, population of this secretive animal. It exists primarily in the eastern mainland area, centred in Cumberland, Colchester

and Pictou counties. Another smaller population is centred in the interior of western Nova Scotia. Our best guess is that there are approximately 150 fishers in Nova Scotia and that the numbers have remained relatively constant over the past 12 years. Harvest levels under the previous bag limit (1 per licence) may be limiting further growth. As a result, last year (1988) fishers were completely protected.

It is our goal to increase the fisher population to a level where they will remain a part of our natural heritage, providing enjoyment for present and future generations of Nova Scotians, and some income to trappers.

-Barry Sabean,

Conservation, Volume 13, Number 2, Summer 1989.



TRACKING THE WEASEL FAMILY

There are several of the Family Mustelidae - the weasels - in this province; most of them are not often seen. None of them hibernates, so Striped Skunk, Fisher, Marten, Mink, Shorttail Weasel and Otter are all about in the winter, and their 5-toed tracks are interesting to find in snow. Those of Mink and Otter will be found near water; Shorttail Weasels in rock piles, hedges and brush. Marten and Fisher both climb trees, the former spending most of its time there. Skunks are meadow and open forest animals, which often come around buildings.

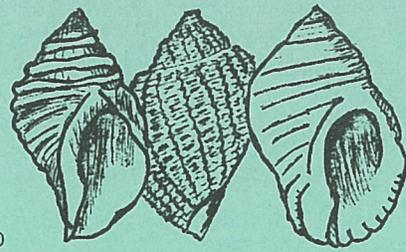
The tracks are not always easy to identify, as the sizes of different species' paws overlap; this adds to the challenge for the naturalist, who may return in the hope of seeing the track's maker, and may be alerted to the presence of an unsuspected species. Some diagrams of Mustelid prints, obtained from various sources, are given here to illustrate a possible winter project.

The techniques of reading and interpreting tracks are described in the Nova Scotia Museum *Info*, "Animal Tracks", and most fully in *A Field Guide to Animal Tracks*, by Olaus Murie (a Peterson Guide). It is even possible to collect tracks made in mud, sand or snow by making casts of them; plaster of Paris is mixed with a little water to the consistency of pancake batter, poured into the tracks, allowed about 10 minutes to set, and then picked up. Some back-yard experimenting is in order, to get the method right. The four-toed cat and dog families make useful comparison species.

-Ursula Grigg

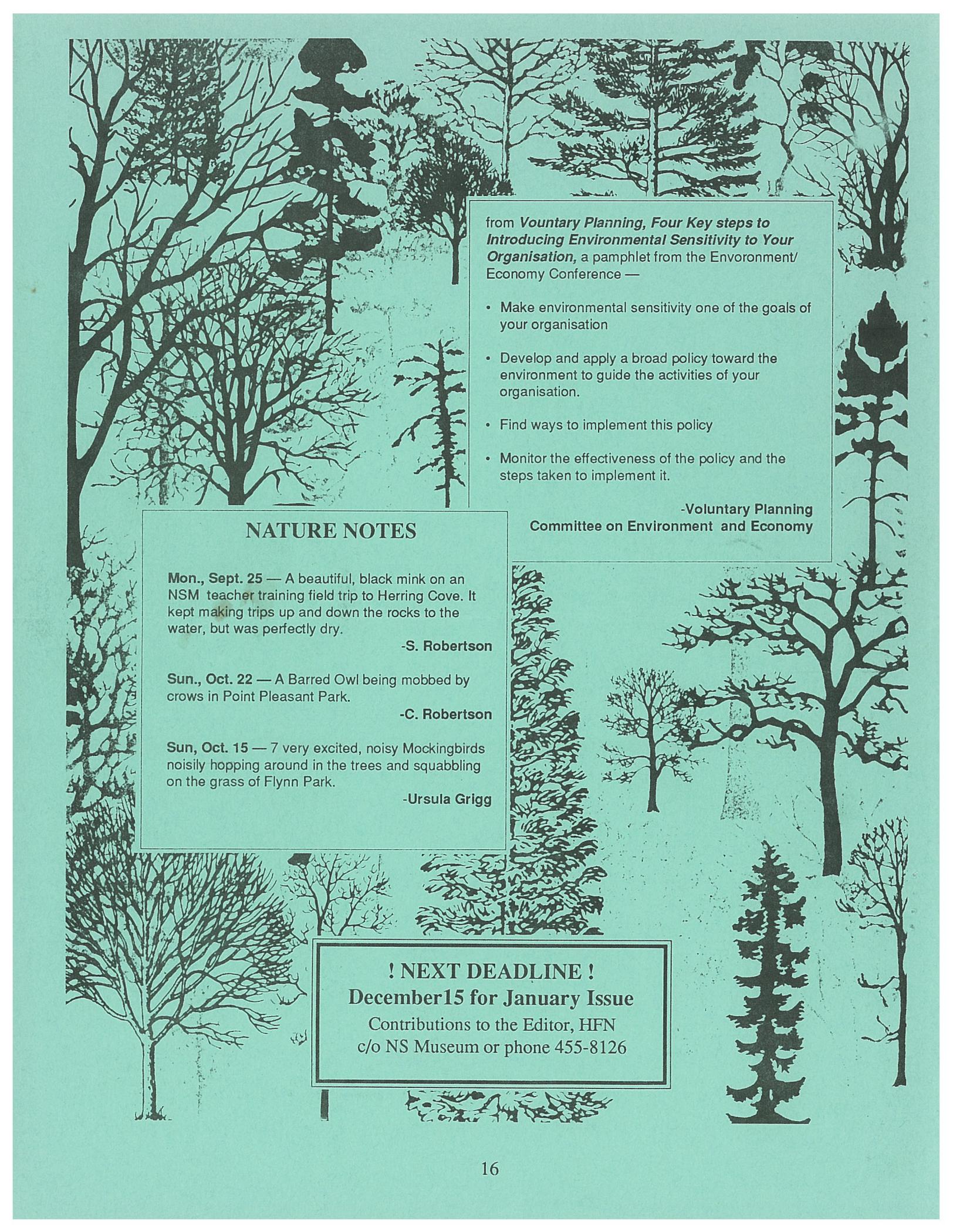
HALIFAX (AST Z+4)

1990



TIDE TABLES

JANUARY-JANVIER					FEBRUARY-FEVRIER					MARCH-MARS													
Day	Time	Ht./ft.	Ht./m	Jour	Heure	H./pi.	H./m	Day	Time	Ht./ft.	Ht./m	Jour	Heure	H./pi.	H./m	Day	Time	Ht./ft.	Ht./m	Jour	Heure	H./pi.	H./m
1	0440	2.0	.6	16	0605	1.8	.5	1	0625	1.6	.5	16	0635	1.6	.5	1	0505	1.0	.3	16	0500	1.2	.4
	1030	5.9	1.8		1135	5.6	1.7		1150	5.6	1.7		1225	5.0	1.5		1045	5.9	1.8		1110	5.2	1.6
MO	1710	.9	.3	TU	1810	1.4	.4	TH	1835	1.3	.4	FR	1835	2.1	.6	TH	1720	1.0	.3	FR	1705	1.9	.6
LU	2315	5.9	1.8	MA				JE				VE			JE	2310	6.2	1.9	VE	2315	5.4	1.6	
2	0540	2.1	.6	17	0000	5.8	1.8	2	0020	6.0	1.8	17	0035	5.2	1.6	2	0605	1.1	.3	17	0545	1.4	.4
	1115	5.7	1.7		0655	1.9	.6		0730	1.6	.5		0725	1.7	.5		1135	5.6	1.7		1150	4.9	1.5
TU	1800	1.0	.3	WE	1215	5.2	1.6	FR	1240	5.2	1.6	SA	1310	4.6	1.4	FR	1820	1.4	.4	SA	1745	2.2	.7
MA				ME	1850	1.8	.5	VE	1935	1.6	.5	SA	1925	2.4	.7	VE	2355	5.9	1.8	SA	2350	5.1	1.6
3	0000	5.9	1.8	18	0040	5.5	1.7	3	0115	5.7	1.7	18	0120	5.0	1.5	3	0710	1.2	.4	18	0635	1.6	.5
	0645	2.0	.6		0740	1.9	.6		0835	1.5	.5		0825	1.8	.5		1230	5.2	1.6		1230	4.7	1.4
WE	1205	5.5	1.7	TH	1305	4.9	1.5	SA	1345	4.9	1.5	SU	1410	4.4	1.3	SA	1930	1.7	.5	SU	1845	2.4	.7
ME	1855	1.2	.4	JE	1935	2.1	.6	SA	2045	1.8	.5	DI	2030	2.5	.8	SA				DI			
4	0045	5.9	1.8	19	0125	5.3	1.6	4	0215	5.5	1.7	19	0220	4.9	1.5	4	0050	5.5	1.7	19	0035	4.9	1.5
	0750	1.9	.6		0825	1.9	.6		0940	1.4	.4		0925	1.8	.5		0820	1.3	.4		0740	1.7	.5
TH	1300	5.2	1.6	FR	1400	4.7	1.4	SU	1505	4.7	1.4	MO	1520	4.3	1.3	SU	1335	4.8	1.5	MO	1320	4.5	1.4
JE	1950	1.4	.4	VE	2020	2.3	.7	DI	2155	1.9	.6	LU	2135	2.5	.8	DI	2045	2.0	.6	LU	1955	2.5	.8
5	0140	5.8	1.8	20	0215	5.2	1.6	5	0330	5.5	1.7	20	0330	4.9	1.5	5	0155	5.2	1.6	20	0130	4.8	1.5
	0850	1.8	.5		0915	1.8	.5		1050	1.2	.4		1025	1.7	.5		0930	1.3	.4		0840	1.8	.5
FR	1405	5.0	1.5	SA	1505	4.5	1.4	MO	1635	4.8	1.5	TU	1635	4.4	1.3	MO	1500	4.6	1.4	TU	1430	4.4	1.3
VE	2050	1.6	.5	SA	2110	2.5	.8	LU	2305	1.9	.6	MA	2235	2.3	.7	LU	2155	2.0	.6	MA	2100	2.5	.8
6	0245	5.8	1.8	21	0315	5.1	1.6	6	0450	5.6	1.7	21	0440	5.1	1.6	6	0320	5.1	1.6	21	0240	4.7	1.4
	0955	1.5	.5		1015	1.7	.5		1150	.9	.3		1120	1.5	.5		1030	1.1	.3		0940	1.7	.5
SA	1520	4.9	1.5	SU	1615	4.5	1.4	TU	1750	5.1	1.6	WE	1735	4.7	1.4	TU	1640	4.8	1.5	WE	1550	4.5	1.4
SA	2200	1.8	.5	DI	2215	2.5	.8	MA			ME	2330	2.1	.6	MA	2300	1.9	.6	ME	2200	2.3	.7	
7	0350	5.9	1.8	22	0415	5.2	1.6	7	0010	1.7	.5	22	0540	5.4	1.6	7	0445	5.3	1.6	22	0355	4.9	1.5
	1100	1.2	.4		1110	1.6	.5		0555	5.8	1.8		1210	1.2	.4		1135	1.0	.3		1035	1.5	.5
SU	1640	5.1	1.6	MO	1715	4.6	1.4	WE	1245	.6	.2	TH	1825	5.1	1.6	WE	1745	5.1	1.6	TH	1655	4.8	1.5
DI	2310	1.7	.5	LU	2310	2.4	.7	ME	1845	5.4	1.6	JE			ME			JE	2255	2.0	.6		
8	0455	6.0	1.8	23	0515	5.4	1.6	8	0100	1.5	.5	23	0020	1.8	.5	8	0000	1.7	.5	23	0500	5.2	1.6
	1200	.8	.2		1200	1.4	.4		0650	6.1	1.9		0625	5.7	1.7		0550	5.5	1.7		1125	1.2	.4
MO	1750	5.3	1.6	TU	1805	4.8	1.5	TH	1335	.4	.1	FR	1255	.9	.3	TH	1225	.8	.2	FR	1745	5.3	1.6
LU				MA				JE	1935	5.8	1.8	VE	1905	5.5	1.7	JE	1835	5.5	1.7	VE	2350	1.7	.5
9	0015	1.6	.5	24	0005	2.1	.6	9	0150	1.3	.4	24	0105	1.5	.5	9	0050	1.4	.4	24	0550	5.5	1.7
	0600	6.2	1.9		0605	5.6	1.7		0740	6.3	1.9		0710	6.0	1.8		0640	5.8	1.8		1215	.9	.3
TU	1255	.5	.2	WE	1245	1.1	.3	FR	1420	.3	.1	SA	1335	.6	.2	FR	1315	.6	.2	SA	1830	5.8	1.8
MA	1845	5.6	1.7	ME	1850	5.1	1.6	VE	2015	6.0	1.8	SA	1945	5.9	1.8	VE	1915	5.8	1.8	SA			
10	0110	1.4	.4	25	0045	1.9	.6	10	0235	1.2	.4	25	0150	1.3	.4	10	0135	1.2	.4	25	0040	1.3	.4
	0655	6.4	2.0		0650	5.8	1.8		0820	6.3	1.9		0750	6.2	1.9		0725	6.0	1.8		0640	5.8	1.8
WE	1350	.3	.1	TH	1325	.9	.3	SA	1500	.4	.1	SU	1415	.4	.1	SA	1355	.6	.2	SU	1300	.6	.2
ME	1940	5.8	1.8	JE	1935	5.3	1.6	SA	2055	6.1	1.9	DI	2025	6.2	1.9	SA	1950	6.0	1.8	DI	1910	6.2	1.9
11	0200	1.3	.4	26	0130	1.7	.5	11	0315	1.2	.4	26	0235	1.1	.3	11	0220	1.0	.3	26	0130	.9	.3
	0745	6.5	2.0		0730	6.0	1.8		0905	6.3	1.9		0830	6.3	1.9		0805	6.0	1.8		0725	6.0	1.8
TH	1435	.2	.1	FR	1405	.7	.2	SU	1540	.6	.2	MO	1455	.3	.1	SU	1435	.7	.2	MO	1345	.5	.2
JE	2030	6.0	1.8	VE	2015	5.6	1.7	DI	2130	6.2	1.9	LU	2105	6.5	2.0	DI	2025	6.2	1.9	LU	1950	6.5	2.0
12	0250	1.3	.4	27	0210	1.6	.5	12	0355	1.3	.4	27	0320	1.0	.3	12	0255	.9	.3	27	0215	.6	.2
	0835	6.5	2.0		0815	6.2	1.9		0945	6.1	1.9		0915	6.3	1.9		0840	6.0	1.8		0810	6.2	1.9
FR	1520	.2	.1	SA	1440	.5	.2	MO	1615	.9	.3	TU	1540	.4	.1	MO	1505	.9	.3	TU	1430	.4	.1
VE	2120	6.1	1.9	SA	2050	5.9	1.8	LU	2205	6.1	1.9	MA	2145	6.5	2.0	LU	2055	6.2	1.9	MA	2035	6.7	2.0
13	0340	1.4	.4	28	0250	1.5	.5	13	0435	1.3	.4	28	0410	.9	.3	13	0325	.9	.3	28	0305	.4	.1
	0925	6.3	1.9		0855	6.2	1.9		1025	5.9	1.8		1000	6.1	1.9		0920	5.9	1.8		0855	6.2	1.9
SA	1605	.4	.1	SU	1520	.5	.2	TU	1645	1.2	.4	WE	1625	.7	.2	TU	1535	1.2	.4	WE	1520	.5	.2
SA	2200	6.1	1.9	DI	2130	6.1	1.9	MA	2240	6.0	1.8	ME	2225	6.4	2.0	MA	2130	6.0	1.8	ME	2115	6.7	2.0
14	0425	1.6	.5	29	0335	1.5	.5	14	0510	1.4	.4	29	0355	1.0	.3	14	0355	1.0	.3	29	0355	.4	.1
	1010	6.2	1.9		0935	6.2	1.9		1100	5.6	1.7		0955	5.7	1.7		0945	5.7	1.7		0945	6.0	1.8
SU	1650	.7	.2	MO	1600	.5	.2	WE	1720	1.5	.5	TH	1605	1.4	.4	WE	1605	1.4	.4	TH	1610	.8	.2
DI	2240	6.1	1.9	LU	2210	6.2	1.9	ME	2315	5.7	1.7	ME	2205	5.9	1.8	ME	2205	5.9	1.8	JE	2200	6.5	2.0
15	0515	1.7	.5	30	0425	1.5	.5	15	0550	1.5	.5	30	0425	1.0	.3	15	0425	1.0	.3	30	0450	.5	.2
	1050	5.9	1.8		1015	6.1	1.9		1140	5.3	1.6		1035	5.5	1.7		1035	5.5	1.7		1035	5.8	1.8
MO	1730	1.1	.3																				



from *Voluntary Planning, Four Key steps to Introducing Environmental Sensitivity to Your Organisation*, a pamphlet from the Environment/Economy Conference —

- Make environmental sensitivity one of the goals of your organisation
- Develop and apply a broad policy toward the environment to guide the activities of your organisation.
- Find ways to implement this policy
- Monitor the effectiveness of the policy and the steps taken to implement it.

-Voluntary Planning
Committee on Environment and Economy

NATURE NOTES

Mon., Sept. 25 — A beautiful, black mink on an NSM teacher training field trip to Herring Cove. It kept making trips up and down the rocks to the water, but was perfectly dry.

-S. Robertson

Sun., Oct. 22 — A Barred Owl being mobbed by crows in Point Pleasant Park.

-C. Robertson

Sun, Oct. 15 — 7 very excited, noisy Mockingbirds noisily hopping around in the trees and squabbling on the grass of Flynn Park.

-Ursula Grigg

! NEXT DEADLINE !
December 15 for January Issue
Contributions to the Editor, HFN
c/o NS Museum or phone 455-8126