

Student Conservationists

A pair of Colby College students, Tim Glidden and Arnie Neustacter, seated in the photograph, look over maps and diagrams from "An Environmental Inventory for the Zoning of Shorelands in the Town of Readfield," a project in which they played a major role. Glidden and Neustacter, both enrolled in the environmental studies program at the college, did the field work for the inventory last fall. The report was prepared as part of the students' January Program of Independent Study and recently sub-

mitted to the Readfield Conservation Committee. Melanie Lanctot, secretary to the committee, is seated at left. Standing, left to right, are Prof. William Gilbert, director of the environmental studies program; Marshall Wiebe, coordinator of the Keep Maine Scenic Committee and a member of the advisory council of the environmental studies program; and Charles Elvin, Jr., chairman of the Readfield Conservation Committee and a staff member of the Department of Environmental Protection.

Readfield Conservation
Commission
March 20, 1973

Mr. William Gilbert
Environmental Studies Program
Colby College
Waterville, Me.

Dear Mr. Gilbert,

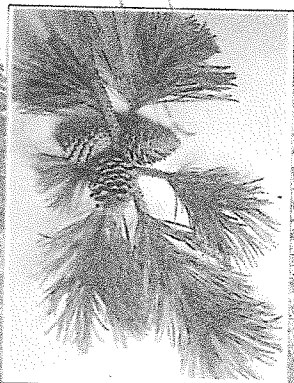
The Conservation Commission has voted unanimously to accept the Shoreland Inventory.

We are impressed by the work that has gone into its preparation, and are anxious to see it accepted by the town.

Sincerely,

Melanie Lanctot

Melanie Lanctot
Secretary



Colby students prepare data for proposed Readfield shoreland law

READFIELD — A pair of Colby College students have played a major role in getting the town of Readfield ready to vote on a shoreland zoning ordinance sometime this summer.

The students, Tim Glidden of Manchester, Mass., and Arnie Neustaetter of Thornwood, N.Y., have prepared a data survey officially titled An Environmental Inventory for the Zoning of Shorelands in the Town of Readfield.

The Readfield Planning Board is in the process of drafting a shoreland zoning ordinance based on information contained in the report which was compiled under a \$750 Ford Foundation grant. It is expected that Readfield voters will act on the proposed zoning sometime before June 30.

Both students are environmental studies majors at Colby, and did the work under the direction of Professor William Gilbert, the college's director of environmental studies.

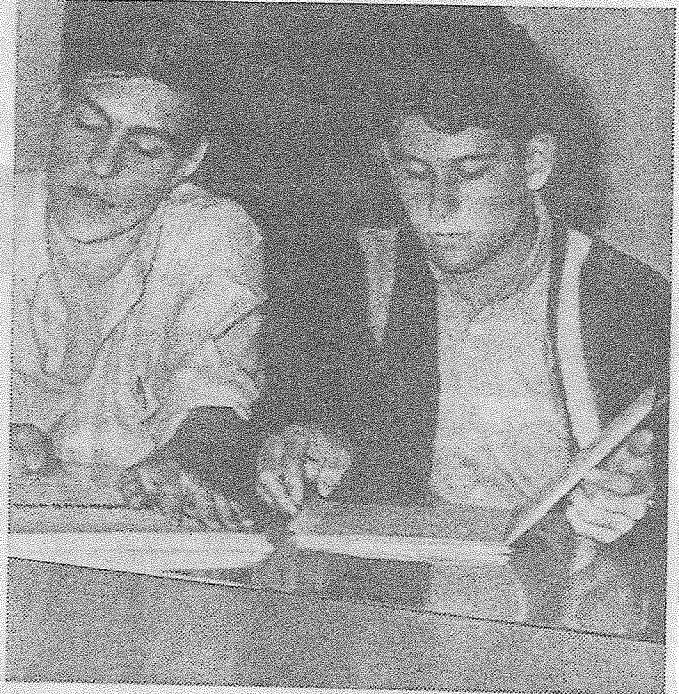
According to Charles W. Elvin chairman of the Readfield

Conservation Committee and a staff member of the Department of Environmental Protection, "We got more than our money's worth in the way the students gathered the data."

Prof. Gilbert said the students did surveying of the waters in Readfield last fall, traveling at least 200 miles in a canoe they borrowed from him. The writing of the report was done during Colby's annual January Program of Independence Study, commonly known as the JanPlan.

The report consists of 80 pages of data, plus four appendices containing property owner lists and various maps. It takes into consideration present land uses, vegetation and soils information gathered from the Soil Conservation Service.

The students, contacted a number of agencies including the Fish and Game Dept., the Southern Kennebec Valley Regional Planning Commission and the Shoreland Zoning Project at the University of Maine.



Student surveys

Colby Students Tim Glidden and Arnie Neustaetter, look over maps from the shoreland zoning inventory they conducted under a Ford Foundation grant for the Town of Readfield.

PREDATION BY WINTER FLOUNDER
(*PSEUDOPLEURONECTES AMERICANUS*)
ON THE SIPHONS OF THE CLAM, *TELLINA AGILIS*

William H. Gilbert¹

and

Ellen F. Suchow

Department of Biology
Colby College
Waterville, Maine 04901

Belle W. Baruch Institute
University of South Carolina
Columbia, South Carolina 29208

The bivalve *Tellina agilis* Stimpson commonly inhabits marine, shallowwater, sand-mud sediments (see Maurer, *et al.*, 1974). These small clams (max. length = 1.6 cm) burrow 1-3 cm into the sediment and deposit-feed on the sediment surface with separate, extensible, inhalent siphons (Gilbert, 1970), movements of which may attract visual predators such as the commercially important winter flounder, *Pseudopleuronectes americanus* (Walbaum). Edwards, *et al.* (1970) have shown that small flounder, *Pleuronectes platessa* (L.), in Scotland obtain a large part of their food by preying on siphons of *Tellina tenuis* da Costa, which can regenerate their siphons. The aim of our study was to seek evidence that small winter flounder prey on siphons of *T. agilis* in nature.

Eight winter flounder (lengths = 4-6 cm) were collected (27 September 1969) at the mouth of Barnstable Harbor (Cape Cod Bay), Massachusetts. The fish were captured by hand net during the flooding tide on a sand flat 0.5 m above mean low water. An abundant population of *T. agilis* (100-600/m²) occurred on the flat, but other clams with similar siphons (e.g., *Cumingia*, *Macoma*, and *Petricola*) were rare or absent (see Edwards, 1975). The fish were placed immediately in 95% ethyl alcohol to terminate digestion, and stomach contents were examined later in the laboratory.

Stomachs of four of the eight fish contained 1-3 siphon fragments (9 total). These fragments and intact siphons of *T. agilis* collected at the site had similar measurements (made at 7× power with an eye-piece micrometer) for total width, width of circular muscle bands, and width of

longitudinal bands (Fig. 1). The length of an extended siphon is 3-4 times shell-length; the fragments ranged from 0.5-2.5 mm in length and were usually identifiable as the siphon tip.

Levinton (1971; Levinton & Bambach, 1975) report that *Macoma tenta* (a subtidal clam) deposit-feeds on detritus at night when its siphons are not visible to fish predators, but that *T. agilis* deposit-feeds on benthic diatoms during the day. Many benthic diatoms concentrate during the day at the sediment surface, which turns a golden-brown hue as a result (Sanders, *et al.*, 1962). Thus the efficiency of daytime grazing by *T. agilis* may outweigh the hazard of exposing siphons to fish predators.

In the laboratory, we observed the behavior of a small winter flounder placed in a water tank with a tray of sediment containing several live *T. agilis*. On two occasions, the fish uncovered clams by lunging at the sediment surface where siphons were deposit-feeding. When each clam attempted to burrow back into the sediment, the fish took a bite out of its foot.

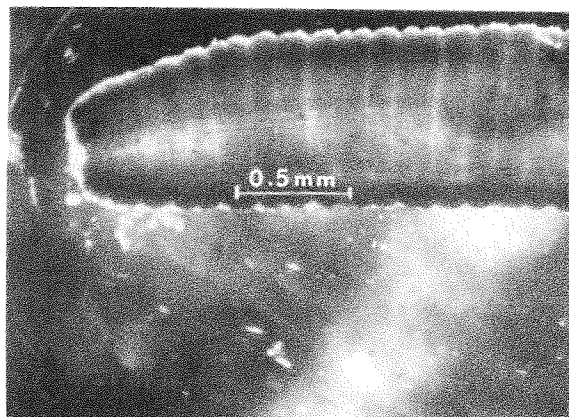


FIG. 1. Intact siphon of a *Tellina agilis* (shell-length = 1.0 cm) in 50% ethyl alcohol.

¹ Present address: Environmental Studies Program, Ottawa University, Ottawa, Kansas 66067.

CONTINUED ON
PG. 17 →

The shoreline of McGrath and Ellis Ponds is largely suitable for development with septic sewage disposal. The shoreline of Messalonskee Lake presents a special situation, in that public sewage lines could be extended along these shores with greater ease than they could be to the other shorelands of the town, the report explains.

"ECOLOGICAL BALANCE," says the report, "does not refer only to the bass, trout, and beaver living in an area, but also to the people who either foul or preserve the land they live on."

The report says that the aging of a lake normally takes thousands of years, but that man is capable of speeding up the process inadvertently by improper construction of sewage disposal systems increasing the rate at which nutrients enter the lake. This aging, stimulated by man, is termed cultural eutrophication.

To prevent congested areas, says the report, minimum lot sizes can be established, with the principle limitation being on the length of shorefront per lot. Depth of lot is important to consider as it permits the septic system to be set back from the water.

To preserve the visual beauty of the shore, a guideline can be established which encourages dwellings to be set further back from the shorelines. Certain natural areas of each water body should also be protected with a complete ban on building in the more fragile wetlands, as provided for in existing state codes.

THE TWO COLLEGE students were recruited for their summer project by Dr. William Gilbert, director of environmental studies at Colby, and Ira Ellis of the Cooperative Extension Service office in Augusta.

Miss Majdalany, a junior at Colby now spending her first semester in France, changed her major from art history to environmental studies in her freshman year at the invitation of Dr. Gilbert.

Glidden, a senior at Colby, entered the college as an environmental major. He also plans to follow a career in environmental planning and protection.

"I LOOK UPON this summer's job not only as a service to Oakland and to the people of Maine, but also as an important educational experience for me," he said.

THE EXTENSION OFFICE also recruited volunteers to help with project, including two Menonites from Pennsylvania. One was doing his alternate service as a religious conscientious objector. Several area high school students also joined the group.

Although the high school students received minimal training, the two older men, Glenn and Orval, are now completing a survey of the Kennebec River environment for the Southern Kennebec Regional Planning Commission.

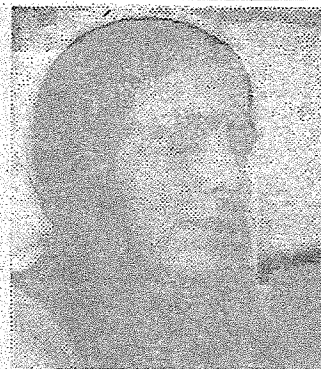
"The shoreland inventory," said Miss Majdalany, "proved

to be a thoroughly satisfying experience. Tim and I were our own bosses. We had a definite goal to reach by the end of the summer and it was up to us to get the work done. Every day offered something different."

The two students said they didn't know if Colby College

would give them any course credit for their environmental survey of the lakes, but they both agreed the work had been educational, enjoyable, difficult, and a service to the community.

"In sum," said Carol, "a thoroughly rewarding summer."



CAROL MAJDALANY

Belgrade Environmental Study Calls For Action

POST SCRIPT :
↓

Two Colby College students who spent the entire summer surveying shorelands of the Belgrade Chain of Lakes, are preparing an environmental report which stresses immediate action on the part of the Town of Oakland, even though they said they were faced throughout the summer with less than enthusiastic response from officials.

"We were amazed at the apathy and lack of interest toward our work on the part of some local officials," said Carol Majdalany of Stamford, Conn., "and yet we found the people themselves very concerned about the quality of their lakes.

The report, due within the month, contains a survey description of the shorelands, makes recommendations for development guidelines, and presents maps of everything from vegetation to water classification and soil suitability.

THE REPORT CALLS for immediate organized planning and enforcement lest the people of Oakland and the surrounding communities be faced with a serious problem as the quality of their lakes deteriorates, explained Tim Glidden, Manchester, Mass.

He said the only agency capable of doing the in-depth job required is the Town of Oakland itself.

"Allowing the state to do the planning for the town is a grave mistake," he said. "To do a really good job, Oakland must act now."

He added that formation of lakes associations which would take an active interest in the quality of the lakes areas, both esthetic and ecological, could aid the town in its study.

GLIDDEN SAID the survey description includes East Pond, McGrath and Ellis Ponds, Messalonskee Lake, and Messalonskee Stream which includes Messalonskee Pond.

The survey, sponsored by the Cooperative Extension Service of the University of Maine, was conducted door to door, and the two students said they were particularly impressed with the old timers who had actually watched the deterioration of the water during the past few years.

"Many acknowledged the fact," says the report, "that a large number of all the septic systems employed were not within the limits prescribed by the revised state plumbing code."

OTHER FAULTS were also observed, according to the report. On Messalonskee Stream, which flows past the Cascade Woolen Mill through Oakland and Waterville, it

was noted, "Almost all the homes on this stretch are on the municipal sewer system although a few still have direct pipes into the stream."

The report's recommendations for zoning development guidelines points out that the purpose is to protect the wetlands, important wildlife habitats, soils particularly ill suited for development, and the natural or scenic areas designated by the federal, state, or municipal governments. The uses allowed within restricted districts include agriculture, forestry, hunting and fishing, and private or public parks.

THE REPORT STATES generally that conditions on the Oakland shoreline of East Pond are relatively good for moderate development.



Surveying The Belgrade Chain

Students working last summer on a survey of the Belgrade Chain of Lakes as they relate specifically to Oakland and surrounding area, are, from left, Tim Glidden, student from Colby College, Orval Graybill and Glenn Metzler, both volunteers from the Co-

operative Extension Service in Augusta, and Carol Majdalany, also a student from Colby. The report of the survey is due to be presented within the month to the Town of Oakland. (Sentinel Photo by Bill Hunt)

Shoreland Zoning Plan Is Accepted By Planning Board

OAKLAND — Messalonskee Lake and Stream, Ellis, McGrath, and East Ponds, all bodies of water located in this Kennebec County community, are included in a shoreland zoning plan which was accepted Tuesday night by town planning board members meeting here.

The plan now faces a public hearing which is tentatively scheduled Tuesday evening, Feb. 25, at 7 at Messalonskee High School off Oak Street.

8 FEB. 1975
MORN. SENTINEL

KENNEBEC RIVER CORRIDOR PLAN

NORTH KENNEBEC REGIONAL PLANNING COMMISSION

ACKNOWLEDGEMENTS

ELERY KEENE, EXECUTIVE DIRECTOR OF NKRPC

The Kennebec River Corridor Plan was guided by the NKRPC's Kennebec River Corridor Committee. Committee members Clinton Townsend, Sheila Seymour, Tom Gordon, William Gilbert, and Steve Clark provided valuable input that was much appreciated.

The following agencies and groups cooperated: Department of Inland Fisheries and Game, Bureau of Parks and Recreation, Land Use Regulation Commission, Department of Environmental Protection, Department of Marine Resources, State Planning Office, Department of Transportation, United States Geological Survey, Natural Resources Council, Kennebec Valley Conservation Association, Central Maine Power Company, and the Kennebec Water Power Company.



Taking a poke at the lake

Five Colby College environmental students have worked long hours for the past month on Annabessacook Lake. Above, they are pushing a plastic pipe through a hole in the ice to the bottom of the lake for samples. The pipe will go 10 feet into the lake bed, but most samples are about five feet deep. The sediment will be kept frozen until the watershed district finds laboratory facilities to analyze it. (KJ Photo by Roach).

Individual Study Reaches Into Community

AN INTRODUCTION

Since 1961, Colby College students have returned to the Waterville campus after completing the first semester's studies and have leaped into the school's January Program.

"Jan Plan," as it is referred to most frequently, is a program of independent study by which students may pursue, in groups, or individually, an area of personal interest for intensive study.

There are structured areas, course headings which reflect the more traditional ideas of academic pursuit. But there are, as well, independent projects which are the sole creation of a student's personal desires.

BEYOND THE STRICT definitions of academia, some of these independent projects reach into the community and reflect a symbiotic relationship which can bring benefit to the community as well as the student searching for new learning experiences.

Some projects chosen by Colby students and completed this past month demonstrate the means by which a college community can reach into the everyday world and effect a positive influence.

Pat Hotchkiss, who joined the Morning Sentinel staff during January, checked out a few fellow "Jan Plan" students to find out just what they were doing outside the ivy-covered halls.

By PAT HOTCHKISS
(Jan Plan Intern)

STUDY POLLUTION

Five sophomores, all en-

vironmental studies majors, worked in East Winthrop with the Cobbossee Watershed district looking for answers to pollution problems at Lake Annabessacook.

That lake has an unsightly "green color" Steve Roy and Mike Poulin, both Waterville natives explained. With three cohorts, Robert Keefe of Nashua, N.H., Herbert Magid of New Sharon, Mass., and Mark Lauritano of Englewood, N.J., they were at the lake each morning taking samples of one kind or another.

TWELVE DIFFERENT test stations were set up and water samples for oxygen content, and acidity level taken. The group also took core samples of the lake's bottom for further analysis by the Department of Environmental Protection (DEP).

Steve explained that the major focus of the study was

to determine the effect of a large mass of "sludge" covering about 24 acres of the 1400 acre lake.

That sludge was deposited by a waste treatment plant located at the northern end of the water body. Preliminary studies will be used to determine the effect of this sludge on the "pea green" algae growth found in the lake.

"THE DATA is a necessary first step toward cleaning up the lake," Steve said of the project. He and Mike said that the five man team working with the watershed district is applying for a \$10,500 grant from the National Science Foundation to further studies during the summer.

The Jan Plan project could very well turn into a summer job for these five. The benefit derived from the continuing studies would serve Lake Annabessacook and the residents in the area as well as the college students involved.

(Continued)

Proper supervision of dam operations and water levels is a major task for which the District has insufficient resources. A hydrological survey is now under way; this survey should compile data on the watershed which may be used to predict water movements and to prepare a plan for flood control. While the District has the authority to acquire and operate dams on its own, District trustees have chosen cooperation with present dam owners as a more economical means of managing water levels.

With a professional staff of two, the District has called upon volunteer help (with student interns, in particular) to supplement its programs. Lake protection, restoration, and management is an ongoing responsibility, but the state's only regional water management agency, as a coordinator between state government and local interests and with a focus on these particular problems, seems in a strong position to enhance the environment of the Cobbossee watershed.

by Tom Gordon, Executive Director
of the Cobbossee Watershed District

ITEM 27a

ITEM 26 (CONT.)

Dedication
of the
Colby-Marston Preserve
as a
Registered Natural Landmark
by the
National Park Service
United States Department of the Interior

*In the twilight I went through the swamp,
and the yellow birches sent forth a yellow gleam
which each time made my heart beat faster . . .
If there were Druids whose temples were the oak groves,
my temple is the swamp.*

Henry David Thoreau, from *The Journal*



May 13, 1975
Smith Lounge
Runnals Union
Colby College
Waterville, Maine

When the continental ice sheet melted away from the Belgrade area of Maine some 12,000 years ago, it left behind a ridge of gravel and boulders, called an esker, which runs north and south for more than ten miles through the town.

Large chunks of ice were stranded in some of the deeper deposits and, as they melted, deep depressions called kettles were formed. The Colby-Marston Preserve, a classic example of a northern sphagnum bog, contains such a kettle which extends some 55 feet below the surface of the water.

Distinct vegetation zones make the preserve an outstanding laboratory for ecological study and research. Here, in an unspoiled and natural setting, students may discover many of the flora species currently found in the wet tundra areas of northern Canada—peat moss, cotton grass, Labrador tea, black spruce and pitcher plant.

Given to Colby by Miss Dorothea Marston, the 20-acre preserve is the 180th site to be included in the National Registry of Natural Landmarks. Well known as a leader in Maine's conservation movement, Miss Marston made the gift to Colby in 1966 in honor of her father, the late Walter Forrest Marston, educator and publisher, who graduated from the college in 1871.

Remarks

President Robert E. L. Strider

Prof. Miriam F. Bennett
Dana Professor of Biology
Chairman, Department of Biology

Presentation

Mr. Paul Favour
Special Assistant to the Director
North Atlantic Region
National Park Service

Reception to Follow

Annabessacook restoration

By SUSAN CALDON
KJ staff writer

If money comes . . .

If money comes through to finish a study at the north end of Annabessacook Lake, a restoration project may be underway there by next summer.

The Cobbossee Watershed District is studying a massive sludge deposit left at the north end of the lake by the Winthrop sewer plant, which stopped dumping into the lake about four years ago.

The district started testing under the ice about a month ago, using Colby College environmental students.

But a more intensive program is planned for this summer, with a professional chemist, geologist and biologist working with the students and the district staff to find the best possible restoration method.

Thomas U. Gordon, executive director of the watershed district, said last week that if the study is finished, he will come up with concrete proposals for the 1976 budget.

The Colby students, who finished their work here last week, determined the extent of the sludge delta and took samples of the lake bottom and the water to determine phosphorous content. Phosphorous is a main cause of algae blooms.

Gordon wants to find how much phosphorous is still in the sediment and how much is leaching into the water. The complicated chemical analysis is to be done by the state Dept. of Environmental Protection, the University of Maine or a private laboratory.

The Colby College interns, in cooperation with the district, have applied for a \$10,000 National Science Foundation grant for further research this summer. That money would hire the professional scientists to work with the students and the district staff for three months.

A decision on the grant should be made by April, Gordon said.

"If the application is rejected, other sources of funding will be sought to make the project operable. The Watershed District board of trustees has eliminated a proposal to appropriate an additional \$8,000 for the 1975-76 budget to operate the project. Thus, if outside funding is not found, the restoration research will have to be curtailed," Gordon said.

Members of the Annabessacook Lake Improvement Assn. have accused Gordon of studying too much and doing too little. But Gordon said that as soon as this research project is done, "We have no intention of saying we need to study more. We will make a decision and stick to it."

He admits that one study has been done already, by Dr. Wayne Hall of the University of Maine in Orono, but his report yielded little hard data, Gordon said. And it was done four years ago when "not too much was known about lake restoration technology. He said his recommendations would change if he were doing (the study) now," Gordon said.

One of Hall's recommendations had been to dredge the north part of Annabessacook Lake where the sludge is.

Gordon said dredging is costly and could have a "tremendous impact" on the lake. If the lake bed is not dug out deeply enough, it would open up a whole new surface of nutrient rich material which is now more or less sealed over, he said.

The Annabessacook Park proposal made by the Annabessacook Lake Improvement Assn. would eliminate the sludge problem by burying it and using the area for recreation. Gordon said it would decrease lake volume and increase the concentration of nutrients, and might cause any number of unknown effects.

But he said the park proposal would be studied with all the other possible solutions.

Gordon is enthusiastic and specific about the things that might be done with Annabessacook — planting a marsh to take up nutrients, using an aluminum compound to precipitate phosphorous out of the water, spreading black plastic over the deposit, or simply using cutrine (an algicide) until the lake rights itself.

Gordon like the idea of bio-manipulation, planting rooted vegetation in the north end of the lake to absorb the nutrients before they can be used by the algae. Although a marsh area is usually a sign of lake aging, it will lengthen the life of the rest of Annabessacook, Gordon said.

Gordon wants to make experimental chambers at the north end of the lake this summer to find out which solutions will work.

Whatever is done will have some kind of impact on the rest of the lake, Gordon said.

He said that no lake the size of Annabessacook has been successfully restored, other than by running a sewer line around it. Dredging has been done on lakes of 10 or 15 acres, but Annabessacook is 1,450 acres.

All the studies may show that the best solution is to use algicides for temporary relief from algae while letting the lake flush itself out, Gordon said. Last summer Gordon and the students conducted extensive tests to find sources of septic sewage pollution and Gordon is encouraging

lakeside residents to use non-phosphorous detergents.

"District staff members have also stressed that no restoration activity may be the answer. If the various technological methods prove to be too expensive or too harmful to lake ecology, then the lake may be left to gradually clean itself out by natural flushing. . . . Annabessacook Lake has already shown a significant improvement since the diversion of sewage to the Augusta treatment plant," Gordon said.