LAKE SUPERIOR - FISHING GROUND AND SPECIES NOTES

prepared by Morley Purvis, circa 1976

(Fisheries Technician, Sault Ste. Marie, Ontario Ministry of Natural Resources)

(son of Ivan Purvis, Purvis Fisheries,
Quebec Harbour, Michipicoten Island)

Thunder Bay - The Commercial Fishery.

PURPOSE.

Throughout 1976 an attempt has been made to gather existing information relating to the presence or appearance and disappearance (seasonally) of commercial fish in Thunder Bay. Herein is ~~on account of~~ condensed the experiences and opinions of a few commercial fishermen; their experience has been ~~effected~~ by by ~~natural~~ factors which may ~~control the story~~. Limit their ability to ~~[illegible]~~ assess the situation correctly or communicate well enough to pass on the information.

Fishery Thunder Bay is ~~fished commercially by~~ shared by seven commercial license holders. Only one man is attempting to fish on a full time basis and only since the summer of 1976. One is ~~dormant~~ semi dormant and operated intermittently by a widow who uses what might be described as a transient crew. One is an Indian band license the rest fish on a seasonal basis ~~as~~ as a supplement to their income from various ~~[illegible]~~ other sources. At least one speaks such poor english that no contact has been established, and the band license operators have not been approached due to lack of time to establish a working rapport with them. All but one, seemingly, have chosen to continue operating on closely defined block

fishing grounds whereby they are permitted to fish in open areas only on temporary letters of permission. The one resident open operator also purchases and processes fish for the market and uses the license privelege largely to supplement the supply of fish as the markets demand. In past years it has been customary for open license holders from outside of Thunder Bay to (Hibbet in Black Bay, Magnet Island on the mouth of Black Bay, and from Nipigon) to operate on letters of permission during the early spring. This latter activity occurs where Thunder Bay opens into Lake Superior and is the first area free of ice. ~~For this reason the spring trout quota has been taken by non-residents to the almost total exclusion of the Ecclound local license holders until changed regulations permit a set quota for each of the traditional operators.~~

The Fish

Lake Trout.

The experience of the lake trout fishery since the mid-1950's has been one of almost total decimation of the native stock. This has been blamed on several factors, each possibly being one variable affecting the others.

Although the sea lamprey has almost without exclusion taken the blame for trout depopulation. The commercial

fishery may be blamed for catching the last trout, before the lamprey could get it, in fact some fishermen had been counselled in this line since there seemed no hope of stopping the onslaught of the lamprey in time.

The smelt appeared at about the same time as the lamprey and has been credited with contributing to the trout decline in more than one way; as a poor food source from the view that it was deficient in nutrients to not totally digestible. These are rather nebulous theories which probably accompany a host of others such as competition for space and food.

At any rate the trout decline was followed by a lamprey control program and a massive restocking of hatchery trout for the entire Lake Superior. By the mid 1960's the inshore Lake Trout fishery was composed of upwards of 95% planted fish. In 1962 restrictions were put on the trout fishery and partially removed in 1967 in the form of quotas for various sectors of the Lake. ~~Since Thunder Bay is rebound~~ This quota has been regulated in various ways and for various reasons (one) being to permit a white fishery to continue with a regulated percent trout to the whitefish catch to a seasonal quota permitting an assessment of the progress of both the lamprey control

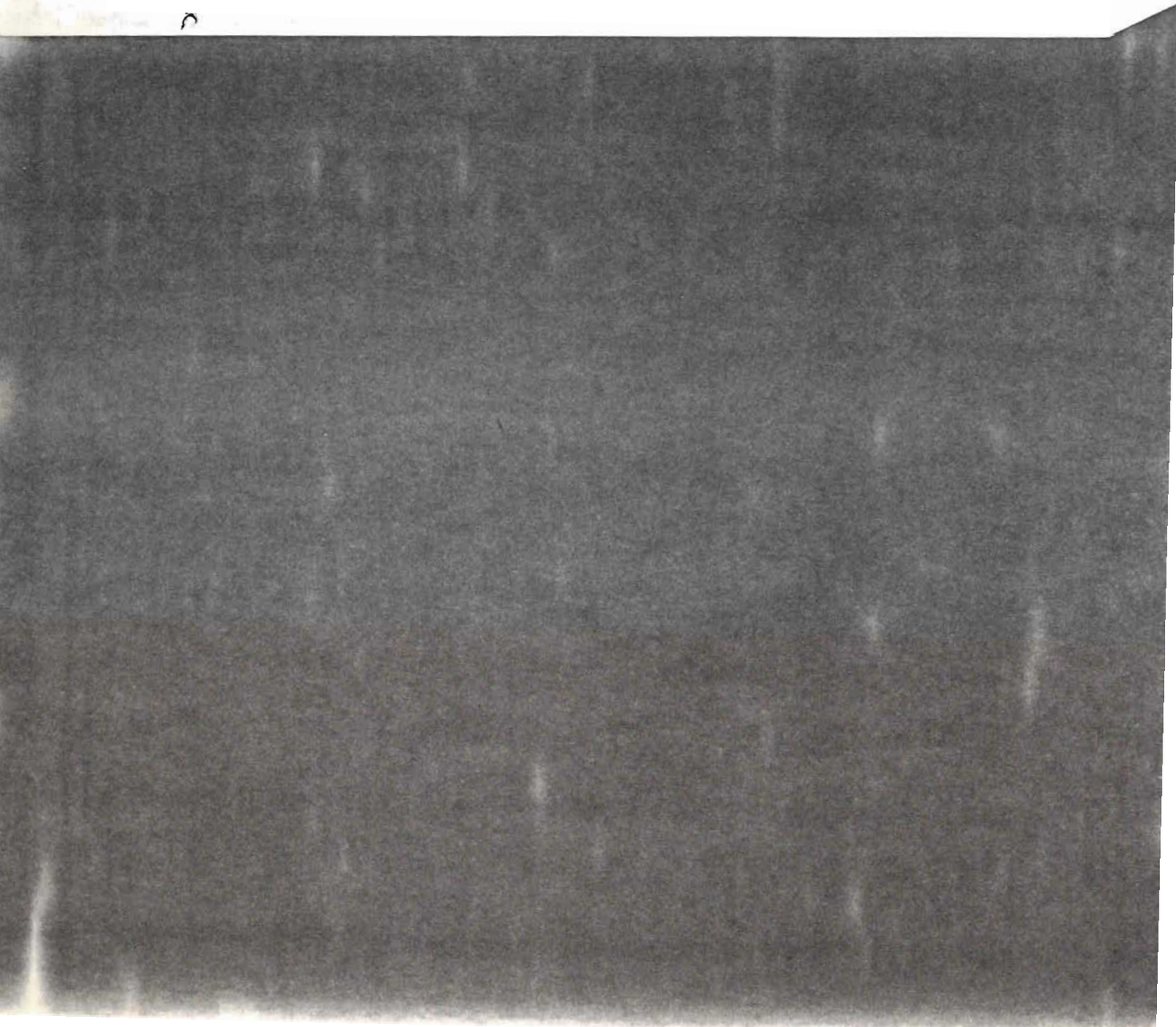
Alex Daigle

- Male trout used to come in first and clean off the rocks (moss) before the females came in to spawn - redfins - 1947 was the last.

- Herring used to run 3 to the pound 15 yrs ago (1962)
- Seldom see more than 3 or 4 at a time and are now running 1 lb each.

- Whitefish come in successive runs - small no 1 in mid July - larger in mid august and again in the fall with light catches of small no 1's in early Oct increasing in no's to a peak from 5th to 11th of Nov - When weather permits the catches consist of Jumbo's up to ~~just~~ the middle of dec.
- Smelts are found ~~in~~ in nets, most plentifully around 18f

- Raymond Daigle observes ammocoete (lamprey) sliding down the sides of the gravel heaps on the dredge at Point Louis.



P. Robinson

- Native trout keep better than stocked trout
- Stocked trout seem to eat more smelts.

G.A. Jones

- Smelts are most plentifull from 15 to 20 fath.

Geo Tyska. Thunder Bay

- W.F. Spawn between Oct 18 - Nov. 5.
- T Bay seem to migrate from West to East along the North Shore of the bay.
- Having spent the summer around the outlets of Kam R.
- Following the spawning period, the W.F. gather in a winter "yard" in a hole north East of Kashabuon Isle range in depth from 15 to 19 fath.

- L.T. are found on spawn shoals along the south side of Kashkabuon Island, Schweitzer shoal, Hare Island Reef.
- LT are found concentrated on these same shoals at ice out time in the spring (early may - late April)

- Herring appear in the

J. Samchuk.

- W.F. Must come on the spawning beds from offshore areas.
- the fish in the area around the Kam Estuaries are tainted with phenols and are shallower and wider.
- The phenols never show up in the spawning run.
- catch Trout throughout the year. Most unpredictable
- Trout run the local river and streams in fall (McIntyre, Mackenzie, Current rivers)
- W.F. Spawning on Switzer and Hare Island shoals may come from the Sawyer Bay stock.

program through scar and wounds counts; and the lake trout stocking program through length, weight, sex ratio and age counts.

The spring quota has been almost entirely caught by the time the ice is out of ~~#~~ Thunder Bay. This catch has been taken, ~~#~~ usually to the total exclusion of local license holders who are still iced in, by the previously mentioned non Thunder Bay license holders who are free from ice earlier in the season. This catch is taken mainly around Thunder Cape and the Hare Island shoals and reefs.

Although the regulations persist call for a spring and a fall quota; in effect it has evolved by general agreement to a total ~~#~~ spring, summer and fall quota being taken incidentally to the white-fish. The spring quota is caught largely in the first few days and the fall quota being reached through the summer on the incidental to whitefish catch. The Provincial Lake Superior Fisheries Assessment Unit has ~~therefore~~ found it necessary to arrange special permits to individual fishermen in order to complete the annual Lamprey and ~~-~~ Lake trout progress study. This study being undertaken each fall simultaneously throughout the entire Lake Superior during the spawning season.

west end. M. Purvis

The commercial fishery on Lake Superior is largely centered around Whitefish, Trout, and Herring, with Perch, Menomenee, Walleye, Suckers, Sturgeon, etc. taking the last place in volume and value to the fishery.

WHITEFISH

There is about a week's difference between the East and West ends of Lake Superior's Whitefish movements. They will normally appear in shallow water along the north shores of Thunder Bay around the 18th of October, on their spawning run and reach a peak of concentration by the 5th of November. They predominate along the north shore partly due to the topography of the lake bottom. The north shore slopes gently to the south, under the water, while the south shore is a steep escarpment except for a stretch of water between and including Sawyer Bay and Hoorigan Point. It has been noted by local commercial fishermen that Whitefish spawn close inshore during fair weather and on the offshore shoals and banks in rough weather. There is not complete agreement as to where the Whitefish have occupied their time prior to spawning. It has been suggested that they move along the north shore from West to East, as the run progresses, and therefore may represent the same stock of fish as is found off the mouth of the Kaministikwia River in summer. Some evidence points to this being impossible because the fish in the Kaministikwia area are noted for having an odour and flavour of phenol pollutants plus a different body structure (shallow and wider) than is found in the north shore spawning run. This might indicate then, that the run comes from possibly a mid-water source and that the tainted fish or 'phenols' as they are often called are a discrete stock and spawn in an, as yet, undiscovered location. The local fishermen feel, also, that the Whitefish found on the short stretch between Sawyer Bay and Hoorigan Point are also discrete and may never move far from here. (Hare Island and Schwitzer Shoals?)

The winter activites of the commercial fishery indicate that the Whitefish stay in an area between Keshkabuon Island and O'Connor point in an egg-shaped basin ranging from 12 to 19 fathoms in depth. They move out of this depression in May, when the ice leaves, and move westerly along the shore, presumably following a water temperature until June when they are either gone or so many suckers have moved in to shallow water that the commercial fishermen pull out their nets. What is sometimes described as a mini run, or a false spawn, occurs both in mid-July and mid-August for about a week; the August run coming on or around the 8th.

A local fisherman reports that the Whitefish eat Herring in winter and smelt spawn in the spring, then small crusty things, green algae or seaweed, insects and sand in summer.

LAKE TROUT

This species is less easily monitored due to the quota limitations imposed upon the commercial fishery. Most fishermen claim that the Lake Trout are abundant to the point of making it difficult to avoid them while fishing for Whitefish. They are found in a wider range of habitat than, but also the same as, the Whitefish and therefore, most of the statistical data is collected as incidental to the Whitefish harvest.

It is felt by most fishermen of the area that the Trout are found in greatest concentrations around the Hare Island, Schwitzer Shoals and the south side of Keshkabuon Island (Caribou). Compared to the original native trout, the planted stock is quite unpredictable. They inhabit grounds now where they were not previously found and are even running up some of the streams in the fall. It is suspected that this is a result of the original hatchery reared spawn having been taken from the vicinity of the Isacor and Dog rivers in the vicinity of the Pukaskwa flats,

north of Michipicoten Island and also Montreal River. These fish had all been of the river run variety (Orval Wohlgemuth personal communication).

Commercial Fish

Spawning Grounds of Eastern Lake Superior

M. Purvis

Information, relating to the locations of commercial fish, is limited in scope due to several factors. The available charts were sounded in the period 1908 - 1915 (Bayfield) with primitive equipment and obviously under hostile conditions. Depths and bottom types are said, by commercial fishermen, to be wrong in a great many cases. Depths are greater or less than indicated and sand, clay and gravel designations are often erroneous.

The data has largely, been gained through direct interviews with commercial fishermen. Each fisherman has a slightly different viewpoint as to why and where fish travel and each feels he has discovered places to set nets that the others haven't, and doesn't want it disclosed. This could be quite true and reasonable.

Due to the distances travelled and the costs and dangers involved, exploration is limited and takes place over a long period of time. Not usually until a "Bank" has been overfished or overcrowded does a fisherman abandon the area for a questionable location. The large boats are limited by depth, nearness to shore and intricacy of sets and there is the ever-present danger of damage or loss of gear from foul weather. Usually the "tugs" are setting to net fish travelling to or from inaccessible grounds. In some fisheries, small boats are employed to fish "on the beach" or areas too shallow for the big boats. This indicates, strongly, that just because an area is not fished doesn't necessarily mean the fish don't inhabit those waters for at least some part of the year. Many places are simply too hostile to be fished due to proximity to rivers and streams and the danger of catching leaves, sticks or breaking conservation laws. Many shoals and shorelines are too open to the effects of weather to be worth setting nets on. Deep "holes" are generally repositories of sunken logs, trees etc. An example of this would be due south of Cap Chaillon in the east end of Lake Superior adjacent to the Lake Superior Provincial Park.

The actual spawning runs of the present commercial species of fish, on Lake Superior, occur in a sequence. For this paper the individual runs will be located in that same order. Lake trout, whitefish, menominee, herring, chub, burbot, smelts and suckers.

Lake Trout

There are four variants of lake trout recognized by the commercial fishery and described in Lake Superior, A Case History of the Lake and its Fisheries by A.H. Lawrie and J.F. Rahrer (1973). These are; fat trout (Salvelinus siscowet) lean trout (S.n. namaycush), halfbreeds and humpers (bankers.)

Deep Fats

Although, little attention is given to the fats due to low marketability, it is commonly believed that they spawn in deep water (50 to 80 fathom)(Eschmeyer, 1955) and from at least, July to November. Some local fishermen claim that the fats come into the deep banks (20 - 60 fathom) east of Pic Island and south of Detention in the area of Port Coldwell to spawn in August. It is also thought that they come to the surface to spawn, over deep waters, south of Michipicoten Island in August. Further investigation is likely warranted in this area.

Halfbreed

Halfbreeds are described as being a cross between fats and leans. This intermingling is, possibly caused by fats spawning in shallower water than normal and leans spawning in deeper water (Lawrie 1973).

Bankers or Humpers

Bankers or humpers are a variant which inhabit such offshore and isolated banks as those found south of Michipicoten Island on Superior Shoal and west of the Pic River. Lawrie (1973) suggests that they compare to the planktonivorous lake trout of certain Algonquin Park lakes. Their shape has altered but fat content is comparable to that of leans. This feature is probably the result of the scarcity of forage fish on the banks. Both

the halfbreeds and bankers gather in shallower water than normal toward the end of September and early October. It can only be assumed, since they are full of eggs, that their spawning period corresponds with that of the lean variant (Salvelinus namaycush). This is the time of year when the weather becomes unreliable, quotas are filled and the major commercial fisherman goes moose hunting.

Lean Trout

Lean trout (S.n. namaycush) are reported to come into shallow water (16 fathom) off Coppermine point on September 5. This date also corresponds with the opening day of the fall trout quota. The actual spawning, takes place on all gravel, boulder and rocky shoals and beaches from less than one fathom to over 10 fathoms at 51^{o}-57^{o}F (10.6^{o}-13.9^{o}c). The length of the total spawning season varies but the largest majority of lean trout spawn between October 15 and 20th. When the trout are spawned out they move off the banks.

River-run Trout

A variant of the lean trout (S.n. namaycush), travels up gravel rivers and streams for as much as two miles to spawn. Documented on the University River (Loftus 1958) and suspected extinct (Lawrie 1973) and then again redocumented (MacCallum 1977). This variant was the object of an intense fishing effort up until the decimation of the species by the sea lamprey. The river run apparently occurred in all of the gravel rivers and streams and was probably best known and exploited at the University (Dog) and Montreal Rivers. Spawn picking, before the complete decimation of stocks occurred, included both of the rivers mentioned (O. Wolgumuth and Geo Daigle, personal communication). The renewed presence of the river-run trout might therefore be a measure of hope for rehabilitation efforts. For the past couple of years, the river runs have been reported as far up the lake as Thunder Bay (Robert Hamilton, personal communication). The examination of the University (Dog) River in mid September 1977 yielded 15 stocked lake trout

in or at the mouth of the river (MacCallum, personal communication). A report of this survey is available from the Wawa District office.

Whitefish (Coregonus clupeaformis)

The whitefish spawning period runs from the first of November to late December in successive runs and in different locations. The whitefish is best known in eastern Lake Superior for its spawning run in the St. Mary's River from the rapids below the control gates up to the entrance of the river at Gros Cap. This is probably due to ease of access for fishermen and adverse weather conditions on other areas of Lake Superior. Fishermen relate stories of heavy spawning runs on the gravel and some sand beaches, including the rivers from the shoreline immediately south of and including the Michipicoten River as far up the north shore of Lake Superior as Oiseau Bay, which harbours large concentrations of whitefish throughout the navigational season. The first run for the areas mentioned begins on November 1st and peaks around the 10th. Temperatures taken in the St. Mary's River (1977) confirms (Lawler 1965a) the conclusion that spawning is generally delayed until the water temperature drops to $46^{o}F(7.8^{o}c)$ and that the spawning peak occurred at a lower temperature. The Gros Cap spawning run is made up of 2-3 pound fish with only the occasional fish over 5 pounds, in depths from 1 to 25 feet.

As the season progresses past November 20th, the larger (jumbo) whitefish over 7 pounds begin their spawning runs on the offshore shoals such as Parisienne Shoal, the Sandy Islands, Pancake Shoal, the shoreline between Corbeil Point to the Pancake River, Pancake Point and Whiskey Rock and presumably on similar locations on up the lake. The weather is so often adverse that fishermen tend to avoid the open water but enough successful years have gone by to establish the truth of the patterns described. The size of whitefish increases as the season progresses through December. The fishermen refer to the late spawners as "Slabs" due to their large size. Forty to fifty years ago, they often ran well over 20 pounds.

The smaller whitefish, known in the industry as number one's, the same as are caught at Gros Cap from November 1-10, show up on their spawning run north of Agawa Bay at Agawa Point, Barret Island and Bald Head. These fish spawn right in close on the beach.

Menominee or Round Whitefish (Prosopium cylindraceum)

The menominee are with the whitefish (Coregonus clupeaformis) when they spawn but spawn later in November when the water temperatures have dropped to 40°F (4°c) in late November and early December (Koelz 1929) (Scott, Crossman 1973).

Lake Herring

Shallow water ciscoe or lake herring (Coregonus artedii) follow the lake whitefish by a week or two in large schools, and commence spawning when temperatures reach 39°-40°F(4-5°c). They spawn on all of the areas of gravel and rocky shoals and beaches that whitefish have spawned on, plus areas of sand or mud (Scott & Crossman 1973). They normally spawn all the way from the St. Mary's River to Thunder Bay on the Canadian side of Lake Superior. For more than a decade their presence has been minimal on the St. Mary's River. The most strongly supported reason for the decline has been changing environment caused by the dumping of wastes from the Algoma Steel Corporation in the upper river, near Gros Cap. The increased populations of rainbow smelt (Osmerus mordax)has been directly related to the declining stocks of lake herring wherever the two inhabit the same waters (Christie, 1973). It might be difficult at this time to assess the size of fish stocks in light of changing markets and effort to supply them throughout the year. Which brings us to the rest of the ciscoes commonly found in Lake Superior.

Chubs

The deep water ciscoes (coregonus hoyi, kiyi and zenithecus) are normally found in deep water of Lake Superior, usually over 50 fathoms (90m). Although it is extremely difficult to distinguish the chubs apart they do

have spawning periods which are spread over the entire year.

The deep water ciscoes of eastern Lake Superior have their main spawning runs from October 15 to at least the end of December, during which time the spawn is collected in quantities to be processed as caviar. This spawning period matches up to the normal periods for Kiyi (November - December and possibly January), Zenithicus (late November - early December) (Scott & Crossman 1973). The commercial fishermen who fish "chubs" this late in the fall have verified these dates but no fishery operates late enough to say whether a species spawn to match the Hoyi (February - March) spawning season. Only isolated instances of mature ripe spawn are identified throughout the balance of the year. The spawning locations in Lake Superior are not thought to vary from the normal deep water habitat 600' (100 fathoms) of the rest of the year and occur on the same fine mud bottom.

Burbot (Lota Lota)

The ling or loche, as commonly recognized on Lake Superior, spawn in bays and on shoals throughout Lake Superior. A sand or gravel bottom is normal and usually in from 1-5 feet of water but is often found in much deeper water during the spawning season from February to March. The preferred temperature is 33^{o}-35^{o}F(0.6^{o}-1.7^{o}c).

Rainbow Smelt (Osmerus Mordax)

The smelt spawns in the spring, usually when the lakes have cleared of ice. They spawn in all rivers and streams on Lake Superior and at a temperature of 48^{o}-65^{o}F(8.9^{o}-18.3^{o}c). "Ice out" usually occurrs in April.

Suckers or Mullets (Catostomids)

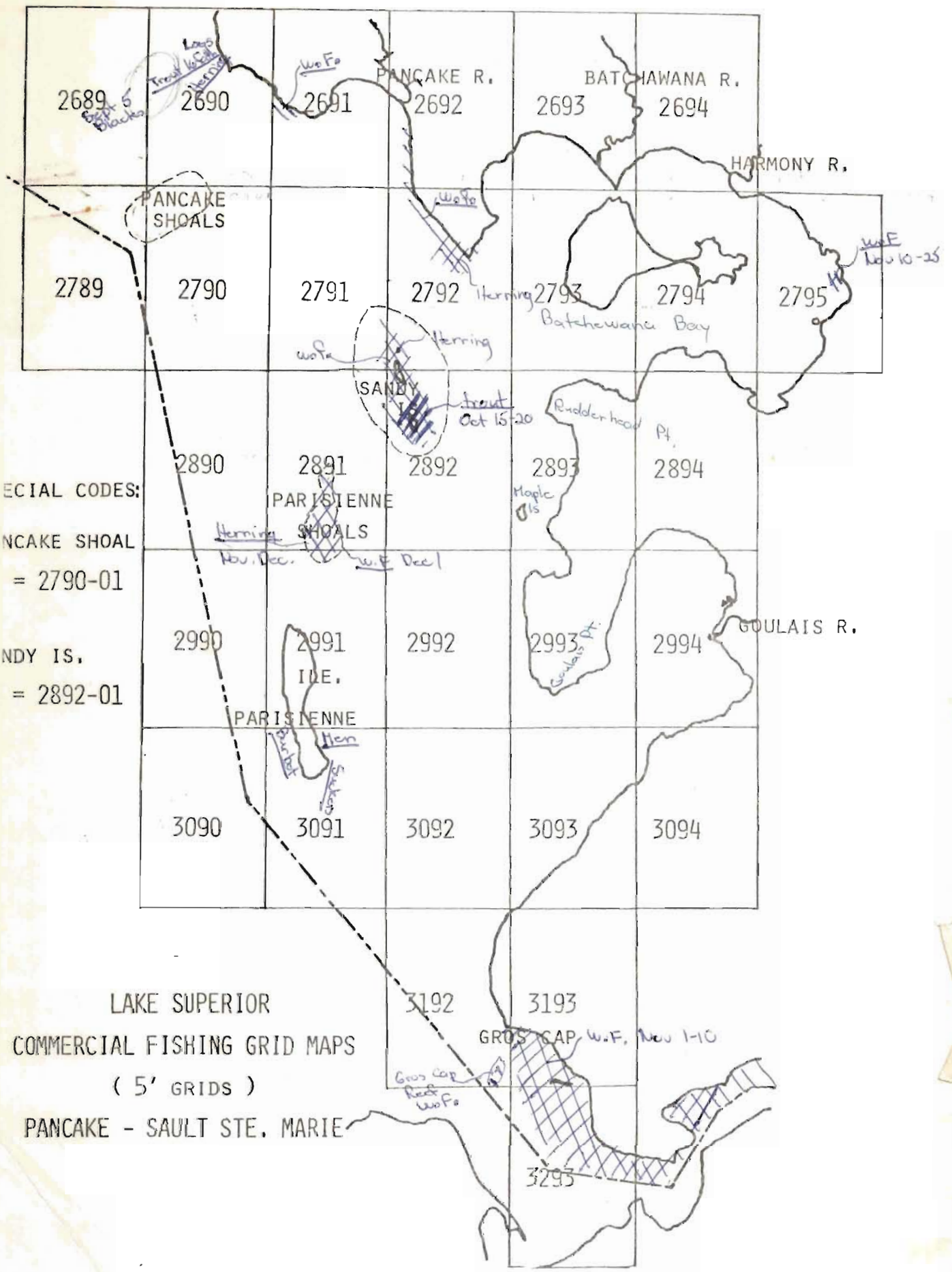
The potentially economically viable suckers will likely include the longnose, white, and shorthead (redhorse) in Lake Superior (Scott & Crossman 1973). They spawn in shallow water, on fine gravel in most of the rivers and streams on Lake Superior. They prefer water temperatures of 41^{o}F (5^{o}c), 50^{o}F (10^{o}c), and 42^{o}-52^{o}F (5.6^{o}-11.1^{o}c) as listed in the order above.

They all prefer flowing rivers or streams but the longnose is listed as spawning on lake bottoms also and the white on lake margins (Scott & Crossman 1973).

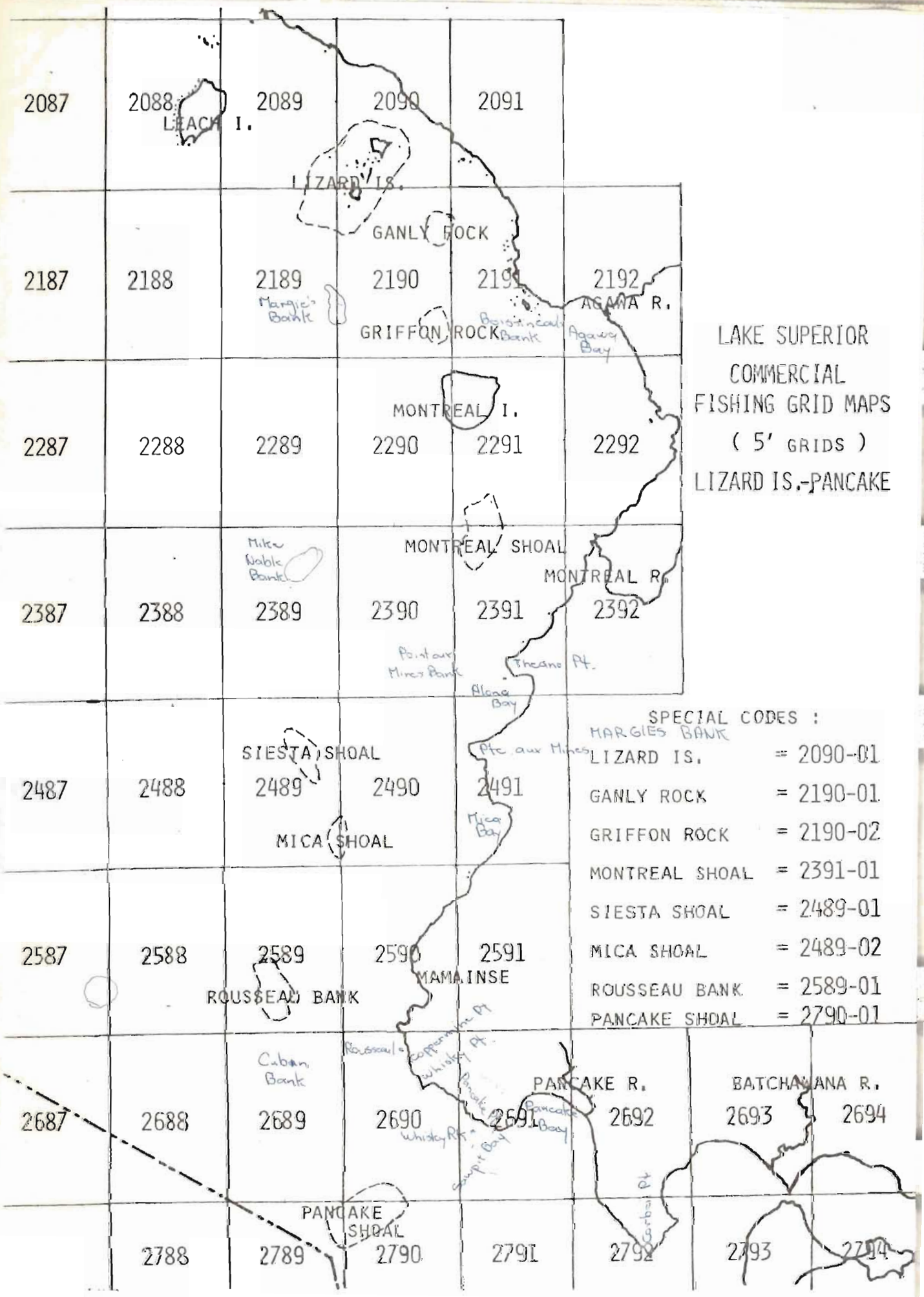
Type	Maturity Spawning time Incubation	Location	Depth & Type	Temperature
Lake ~~Herring~~ Trout				
Fats	(6-7 years) July-Nov. (4-5 mo.)	Deep water banks Port Coldwell Heron Bay, Michipicoten Is., Caribou Island.	20-60 Fath, possibly surface, Boulder Gravel	(51-57°F) (10.6-13.9°c)
Halfbreeds	(6-7 yrs.) Oct. 15 (4-5 mo.)	Pukaskwa, Mich., Caribou, flat and Superior Shoals.	10-20 fath. Boulder gravel	51°-57°F (10.6-13.9°c)
Bankers or Humpers	(6-7 yrs) Oct. 15 4-5 mo.	Pukaskwa, Mich., Caribou, flats and Superior Shoals	10-20 fath gravel	51-57°F (10.6-13.9°c)
Leans	(6-7 yrs) Oct. 15-20 (4-5 mo.)	All boulder gravel shoals and beaches from Gros Cap to Heron Bay, Parisienne Shoal, Sandy Is. Corbeil Pt. to Pancake Pt. Whiskey Rock, Rousseau Bk., Mica Shoal, Siesta Shoal, Montreal Shoal, Montreal River, Griffon Reef, Ganley Rock, Lizzard Is. Baldhead, Leach Is. Cape Gargantua, Indian Hbr. etc.	1-20 fathom Gravel Boulders	51-57°F (10.6-13.9°c)
River Run Lake Trout	(6-7yrs) Oct 15 (4-5 mo.)	Montreal River, University(Dog) McIntyre River, Possibly other	Gravel beds	57°F

Type	Maturity Spawning time Incubation	Location	Depth & Type	Temperature
Corogonids				
Whitefish	Nov. 1-10 (140 days)	St. Mary's River, Gros Cap, Agawa Pt., Barrett Is., Bald Head, Gravel Beaches, Mich Hbr., Heron Bay, Quebec Hbr., East & West Sand Bay	1 fath Gravel	46°F (7.8°c)
Jumbos	Nov. 20 - Dec. 25 (140 days)	Parisienne Shoal, Sandy Is., Pancake Shoal, Shoreline from Corbeil Point to Pancake River, Pancake Pt., Whiskey Rock etc.(as lean trout)	1 fath Gravel	46°F (7.8°c)
Menominee (Round Whitefish)	Nov 15-Dec (140 days)	As whitefish	as whitefish	40°F(4°c)
Lake Herring (Artedii)	(3-4 yrs) Late Nov-Dec. (6-7 Mo.)	As whitefish plus areas of mud and sand		39°-40°F (4°-5°c)
Chubs Zenithecus	(4-5 years)? Nov 20- Dec 10? (6-7 mo.)	? offshore deep water areas	60 - 100+ fathoms Fine mud	?
Kiyi	(4-5 years) Nov - Jan (?)	? offshore deepwater areas	60 - 100+ fathoms	?
Hoyi	(4-5 years) Feb - Mar (?)	? offshore deepwater areas	60 - 100+ fathoms	?

	Spawning Time Incubation	Location	Depth & Type	Temperature
Burbot (Lota Lota)				
Ling, loche, Lawyer	(3-4 years) Feb - March (30 days)	Bays and shoals for extent of L. Superior Under the ice.	1'-5' often deeper Sand gravel	33°-35°F (0.6°-1.7° C)
Raindow Smelt (Osmerus Mordax)				
Smelt	(2-3 years) April at ice out 20 days	All rivers and streams entering L. Superior	-	48°-65°+ F (8.9°-18.3°C)
Suckers (Catostomus)				
Longnose (Red)	(3-4 years) April-May (2 weeks)	Rivers, streams, lake bottoms Entire L. Superior	Shallow Fine gravel	41°F (5°C)
White	(3-4 years) May-June (2 weeks)	Rivers, streams, lake margins Entire L. Superior	Shallow Fine gravel	50°F (10°C)
Shorthead Redhorse	(?) June (10 days)	Rivers and streams Entire L. Superior	Shallow Fine gravel	52°F (11°C)
Walleye (Pickerel) (Stizostedion Vitreum) Yellow Pickerel	Female 3-6 yr Males 2-4 yr April 12-18 days	Whitewater below impassable falls and dams or on lake shoals from Goulais B. to Heron Bay	Shallow Rocky, boulder coarse gravel	42°-52°F (5.6°-11.1°C)



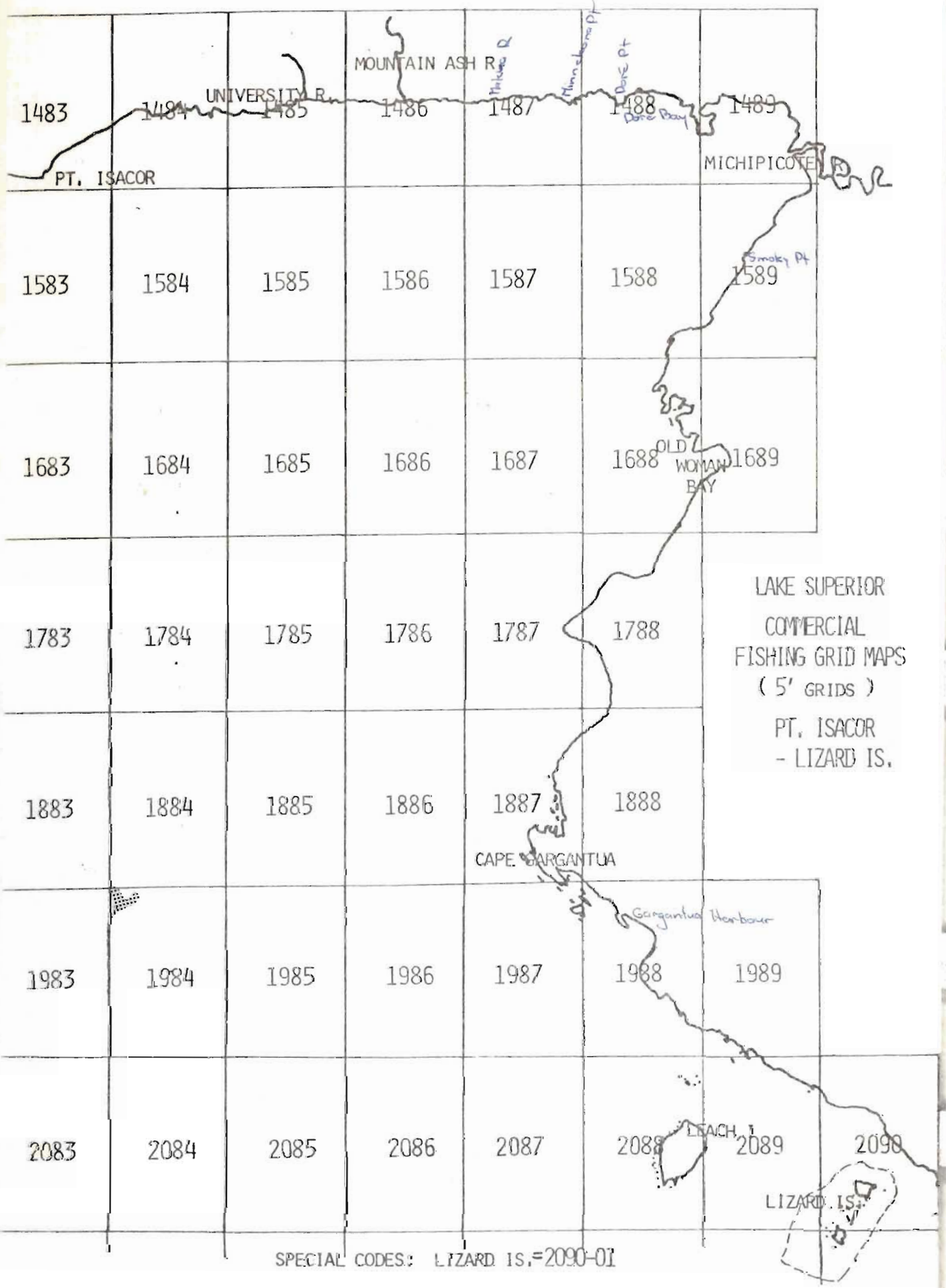
M. Purvis's Map



LAKE SUPERIOR
COMMERCIAL
FISHING GRID MAPS
(5' GRIDS)
LIZARD IS.-PANCAKE

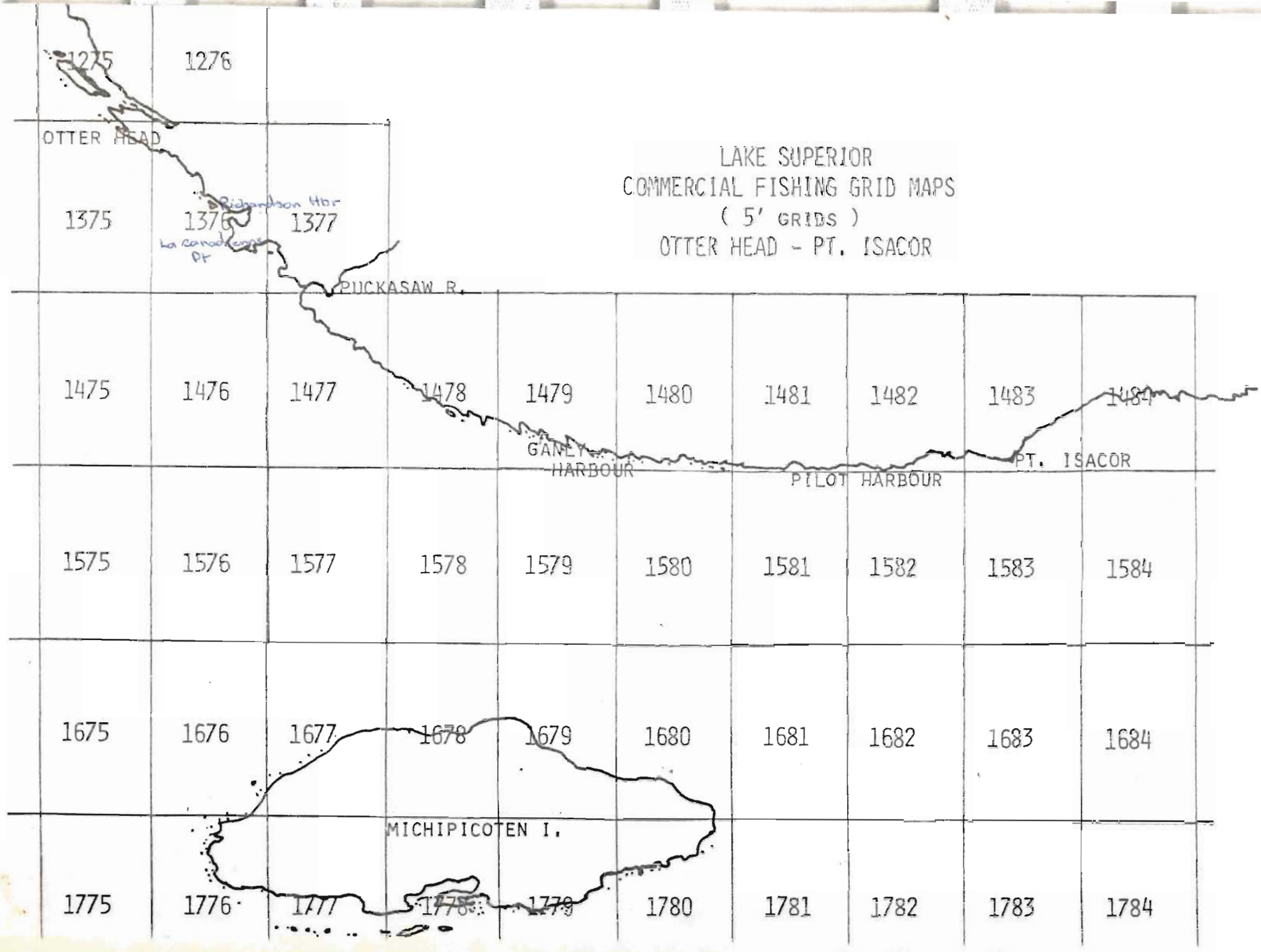
SPECIAL CODES :

MARGIES BANK LIZARD IS.	= 2090-01
GANLY ROCK	= 2190-01
GRIFFON ROCK	= 2190-02
MONTREAL SHOAL	= 2391-01
SIESTA SHOAL	= 2489-01
MICA SHOAL	= 2489-02
ROUSSEAU BANK	= 2589-01
PANCAKE SHOAL	= 2790-01

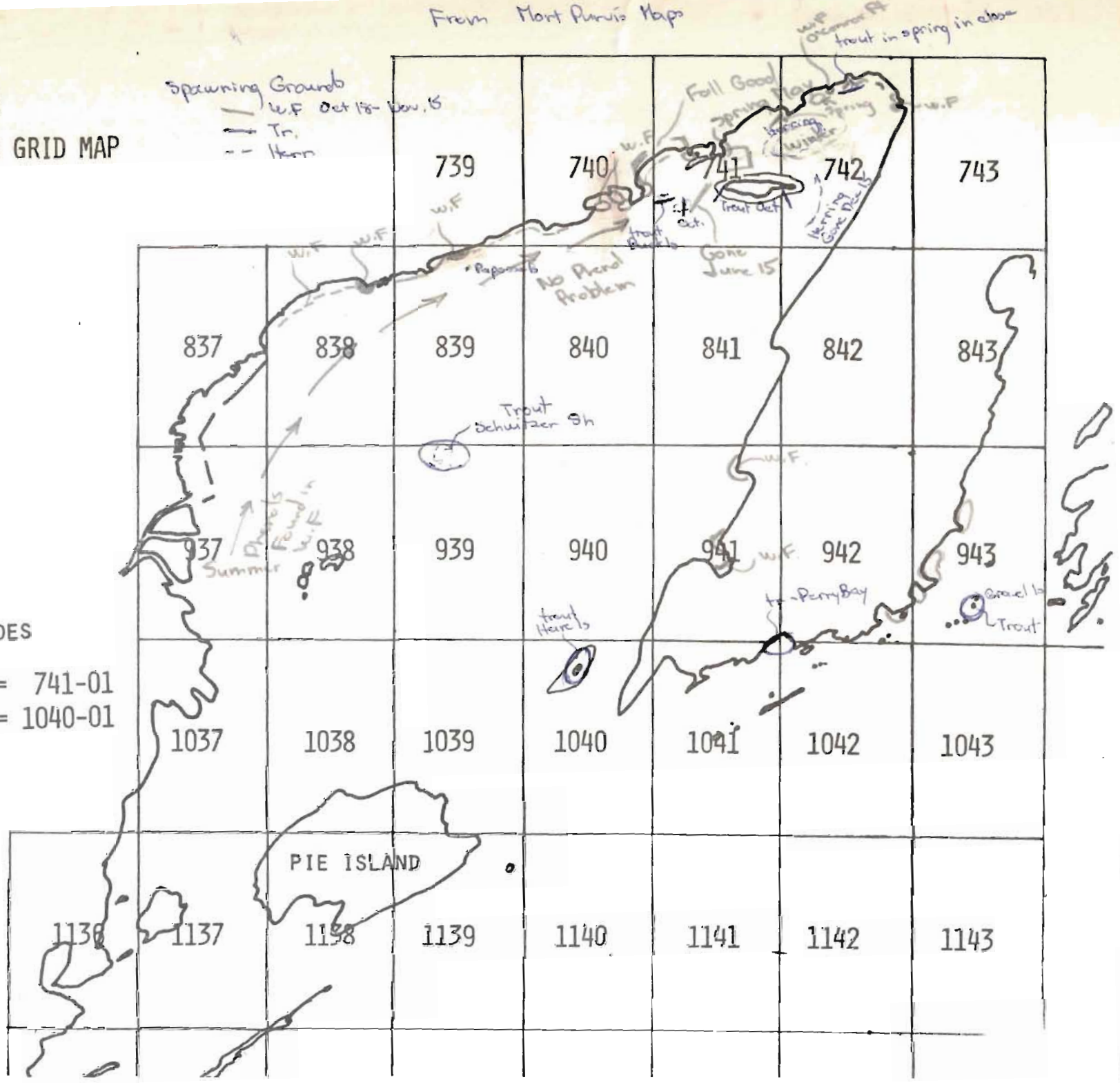


SPECIAL CODES: LIZARD IS.=2090-01

LAKE SUPERIOR
COMMERCIAL FISHING GRID MAPS
(5' GRIDS)
OTTER HEAD - PT. ISACOR



LAKE SUPERIOR
COMMERCIAL FISHING GRID MAP
(5' GRIDS)
THUNDER BAY



SPECIAL CODES

KESHKABUON IS. = 741-01
HARE ISLAND = 1040-01