A Study of the Response of Eastern Spiny Softshell Turtle to Boat Traffic in the Missisquoi River of Northern Vermont.

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for the United States Fish and Wildlife Service, Madeleine Lyttle
May to July, 2001

Study Summary

Introduction:

The purpose of this study was to gauge the degree to which boat traffic in the Missisquoi River affects the basking behavior of the eastern spiny softshell turtle (*Apalone spinifera spinifera*). The data collected attempt to quantify to some degree the various types and extent of disturbance and the reactions shown by the basking turtles.

Methods:

Data were collected between 25 May and 7 July 2001 in the Missisquoi River delta region of the Missisquoi National Wildlife Refuge (see Appendix 1 for maps and coordinates). Observations occurred between 7:00 am and 7:00 p.m. EST. Turtles were observed from between 10 and 50 meters using binoculars. The observer approached basking sites in a canoe with as little paddle activity as possible, an appropriate observation mooring was established, and the turtles were observed for between 1 and 6 hours before the canoe changed positions. The observer recorded notes regarding potential disturbances and attempted to characterize the responses of individual turtles to each disturbance. Notes were transferred to Disturbance Records at a later date.

Results:

. Over the course of the study 195 disturbance events were recorded. The data collected are summarized in Figures 1-3 and Tables 1-2. Approximately 65% of the disturbances were caused by motorized boats, 27% by non-motorized boats, and 8% by other factors such as other animals (Figure 1). In general the turtles responded to these disturbances by leaving their basking sites 37% of the time (Figure 2). Figure 3 gives more specific data, showing that 19% of the time the turtles had no reaction, 39% they were only attentive to the disturbance, 5% they adjusted themselves on the basking site, 6% were washed off the site by the boat wake, and 31% of the time they evacuated to the water.

Table 1 shows no major differences between turtle responses to motorized and non-motorized boats. Noise level seems to have an effect on turtle response, loud noise encouraging greater levels complete disturbance. The same effect is seen with high speed and large wakes. Moderate levels of

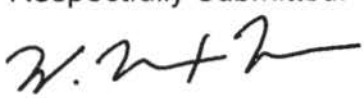
noise and wake seem to reduce the number of complete disturbances. Table 2 provides specific reaction data for each disturbance factor.

Discussion:

The data show that boat traffic is a significant disturbance to *A. spinifera spinifera*. Only 8% of the disturbances recorded came from other sources, and the turtles rarely reacted in any way to those disturbances. On the other hand, 92% of the disturbances were from boat traffic, and approximately 40% of the time the disturbance resulted in evacuation of the basking site. Turtles were known to bask for upwards of 4 hours without entering the water, and boat traffic in the area was 1-2 boats per hour on weekdays, 2-3 per hour weekends. The combination of those two facts indicates that boat traffic must alter the basking regimen of the eastern spiny softshell.

The data indicate that type of boat is probably not a significant factor in degree of disturbance. Although not an intuitive conclusion, an analysis of the factors that could contribute to disturbance gives support to the idea. Although a slow moving and quiet non-motorized boat such as a canoe or kayak (or a trolling motorized boat) might seem less disturbing, one realizes that it 1) stays in the area for a longer time, and 2) is often characterized by the jerky movements of paddling or fishing which themselves might seem very threatening to a turtle. On the other hand, it comes as little surprise that the conditions associated with fast moving, motorized boats are very disturbing. The turtles do seem sensitive to noise, and many of the turtles observed were washed from their basking sites by high wakes. Less clear is the fact that factors associated with moderate speed seemed to decrease the disturbance. This can probably be explained as a combination of two factors: Boats moderate in speed stay in the area a shorter time and probably have none of the jerky physical movements associated with slow boats, while creating less noise and wake than faster boats.

Respectfully Submitted:



W. Max Meyer

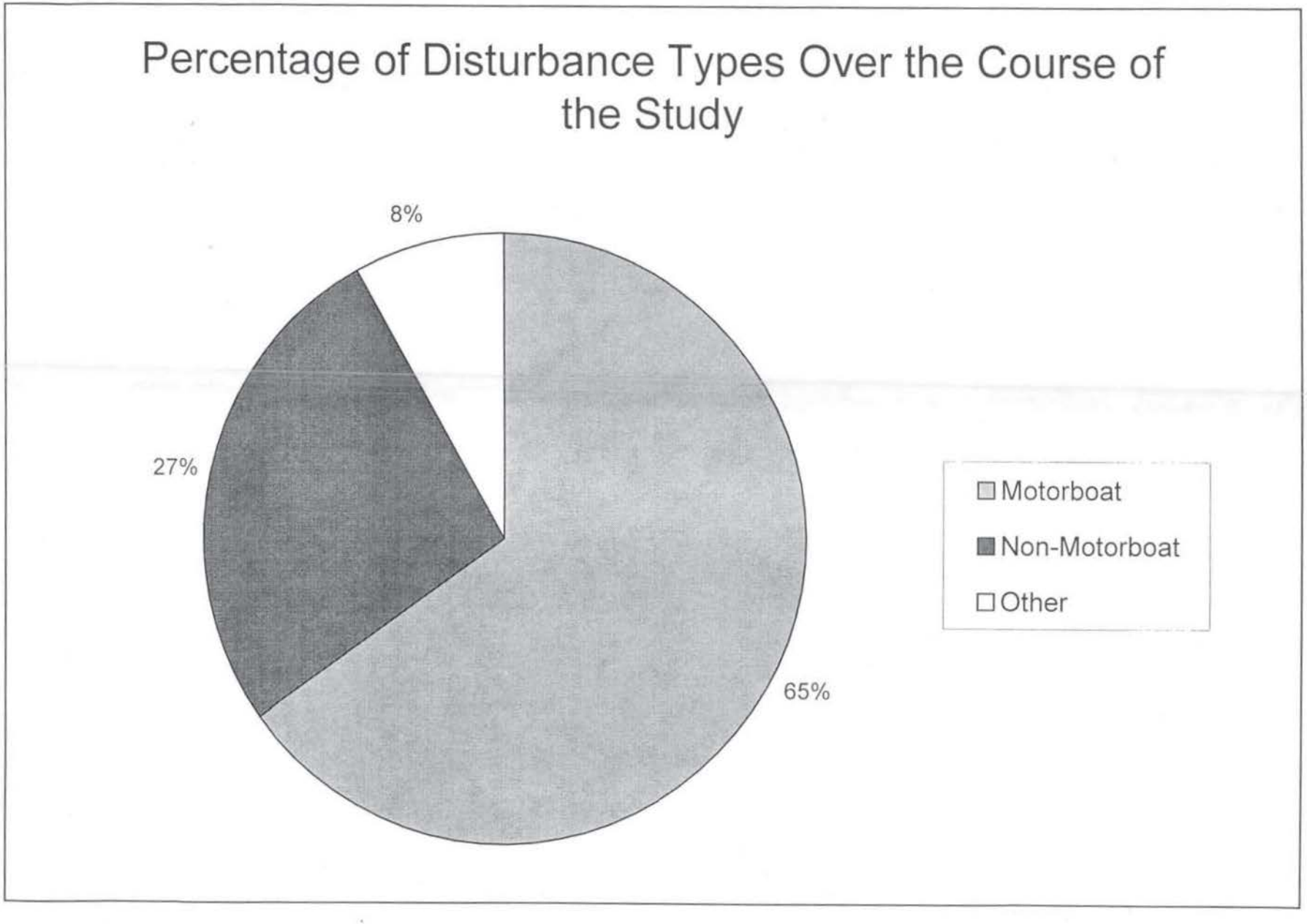

Percentage of Disturbance Types Over the Course of the Study
8%
27%
65%
Motorboat
Non-Motorboat
Other

Figure 1.

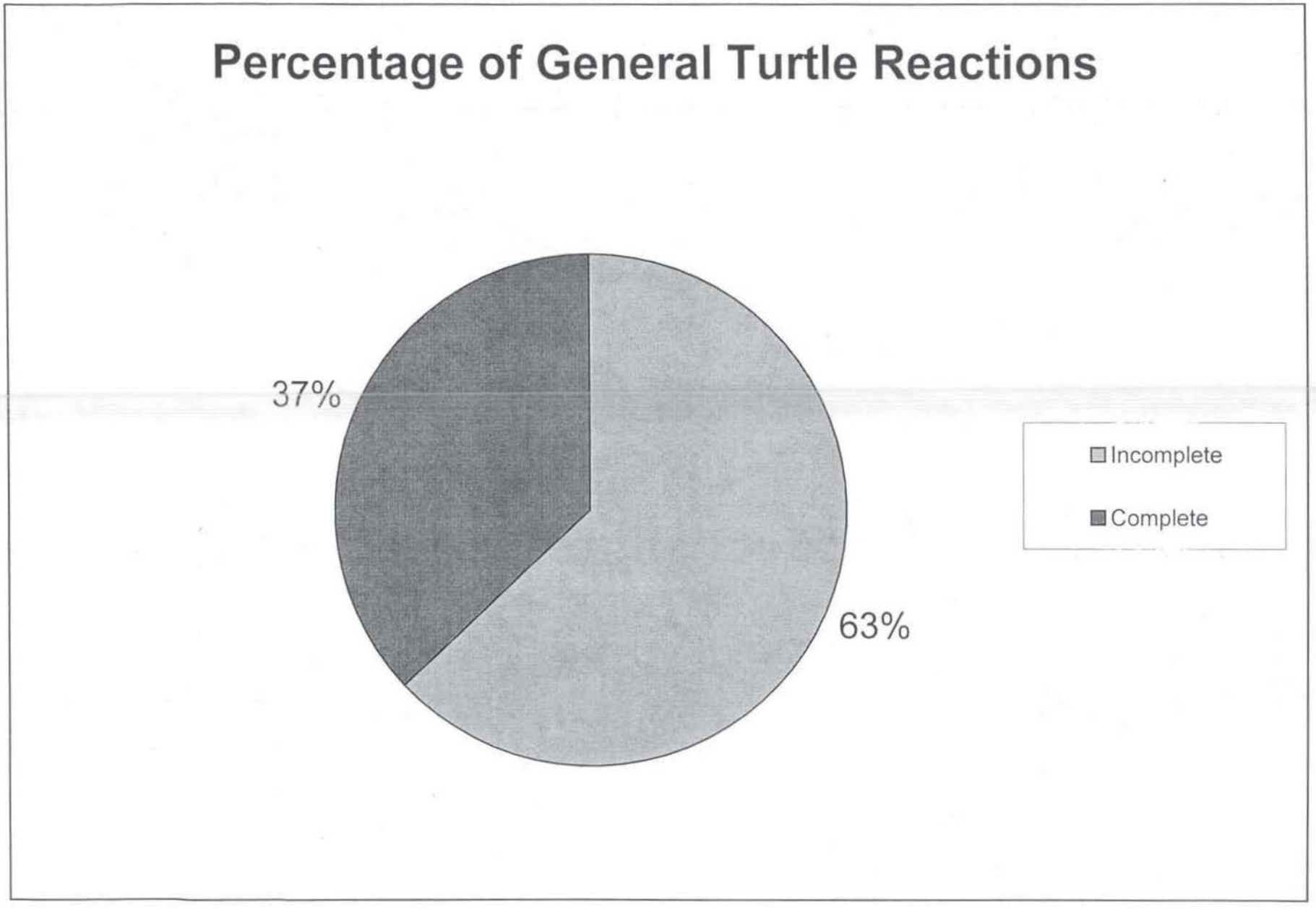

Percentage of General Turtle Reactions
37%
63%
Incomplete
Complete

Figure 2.

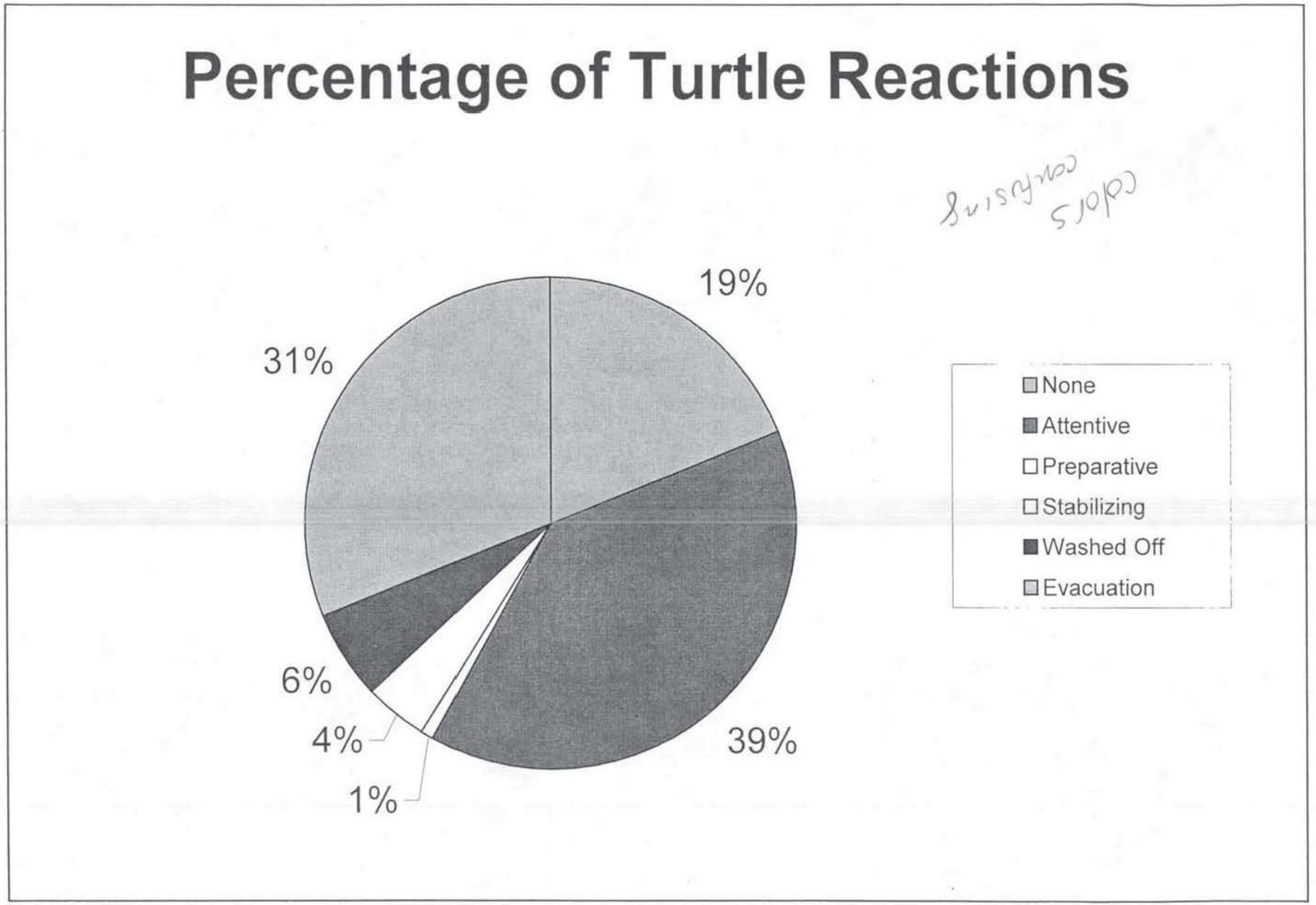

Percentage of Turtle Reactions
19%
31%
6%
4%
1%
39%
None
Attentive
Preparative
Stabilizing
Washed Off
Evacuation

Figure 3.

General Reaction of Eastern Spiny Softshells to Specific Disturbance Factors (% of Total)

	All Data	Type of Boat		Noise			Speed			Wake			Activity	Wake Wash
Reaction		Motor	Non-Motor	None	Low	High	Slow	Med	Fast	None	Low	High		
Incomplete	**63**	62	59	63	*78	*54	64	64	*50	63	*78	*45	*73	62
Complete	**37**	38	41	37	*22	*46	36	36	*50	37	*22	*55	*27	38

Table 1.

what is *?

Reaction of Eastern Spiny Softshells to Specific Disturbance Factors (% of Total)

	All Data	Type of Boat		Noise			Speed			Wake			Activity	Wake Wash
Reaction		Motor	Non-Motor	None	Low	High	Slow	Med	Fast	None	Low	High		
None	**19**	15	16	20	16	18	17	10	11	19	19	6	25	12
Attentive	**39**	39	43	43	55	22	47	41	17	44	39	32	48	33
Preparative	**1**	2	0	0	2	1	0	5	0	0	6	0	0	0
Stabilizing	**4**	6	0	0	4	7	0	8	22	0	14	6	0	17
Washed Off	**6**	11	0	0	0	16	0	15	33	0	3	35	0	26
Evacuate	**31**	27	41	37	22	30	36	21	17	37	19	19	27	12

Table 2.

N = ?

Activity = ?

SUMMARY OF TERMS

Sn: Some noise → inconsistent level of noise such as talking and banging or a low-level of consistent noise such as a quiet engine

Ln: Loud noise → consistent level of loud noise, usually the droning of a large gas engine

Wm: Wake motion → the motion caused when a boat's wake causes a basking log to move

Ww: Wake wash → when a boat's wake actually laps onto or over a basking turtle

A: activity → the jerky, physical movements of a person such as padding, fishing, moving around in a boat

Reactions:

Xr: no reaction → turtle shows no interest in the perceived disturbance

Ar: attentive reaction → turtle cranes neck and looks towards perceived disturbance

Pr: preparative reaction → turtle tenses its body as if preparing to move into the water. Usually this is evidenced by a slight movement of the turtle in response to a perceived disturbance.

Sr: stabilizing reaction → the motion of a turtle associated with an attempt to prevent being washed off a basking log. Usually associated with wakes.

Wr: washed off reaction → turtle physically pushed off basking log by a boat's wake.

Er: evacuation reaction → the action of a turtle abandoning a basking log in response to a perceived disturbance

Disturbance → any uncommon factor in the turtle's environment that it might perceive as a threat

Disturbance event → the reaction of a specific turtle to a perceived threat. As turtles often seem to react as individuals to perceived threats, a single disturbance in the area of

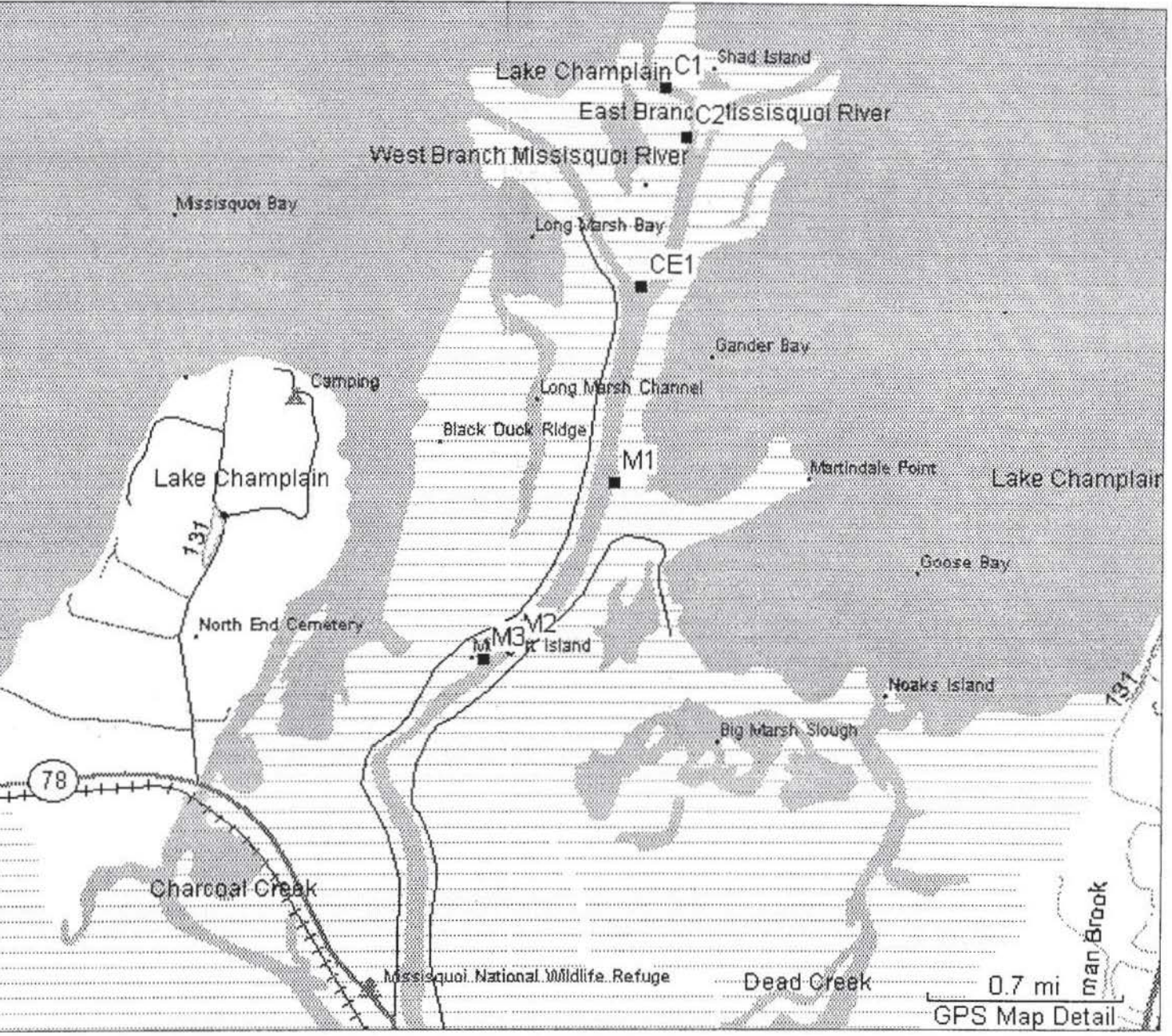
a basking log with 3 turtles will cause 3 disturbance events.

Incomplete disturbance → a disturbance that does not result in a turtle abandoning or being forced off of its basking spot. Includes Xr, Ar, Pr and Sr reactions.

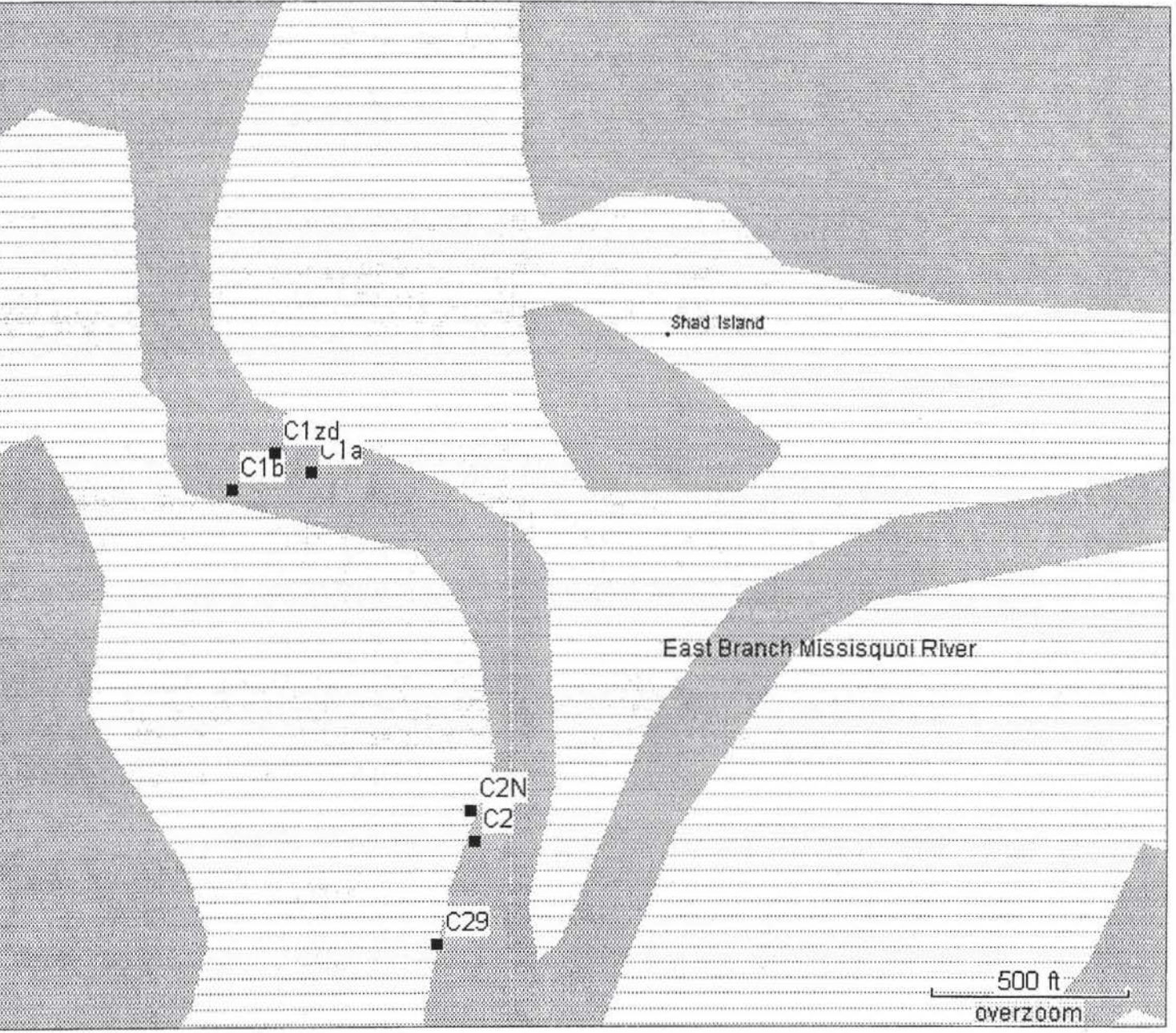
Complete disturbance → a disturbance that results in a turtle abandoning or being forced off of its basking spot. Includes Wr and Er reactions.

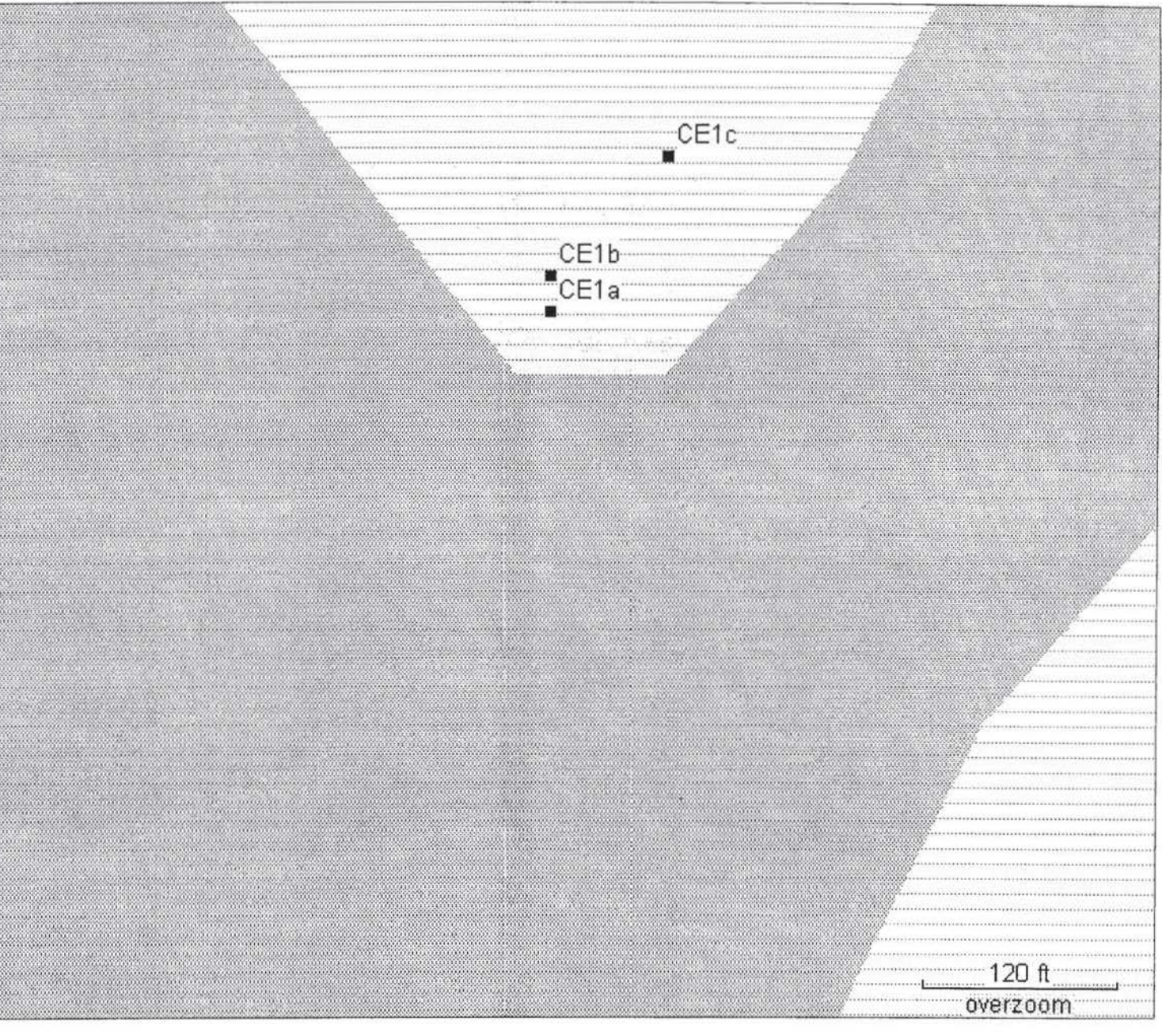
All other terms are self-explanatory and summaries of their meaning can be found on the bottom of the disturbance records.

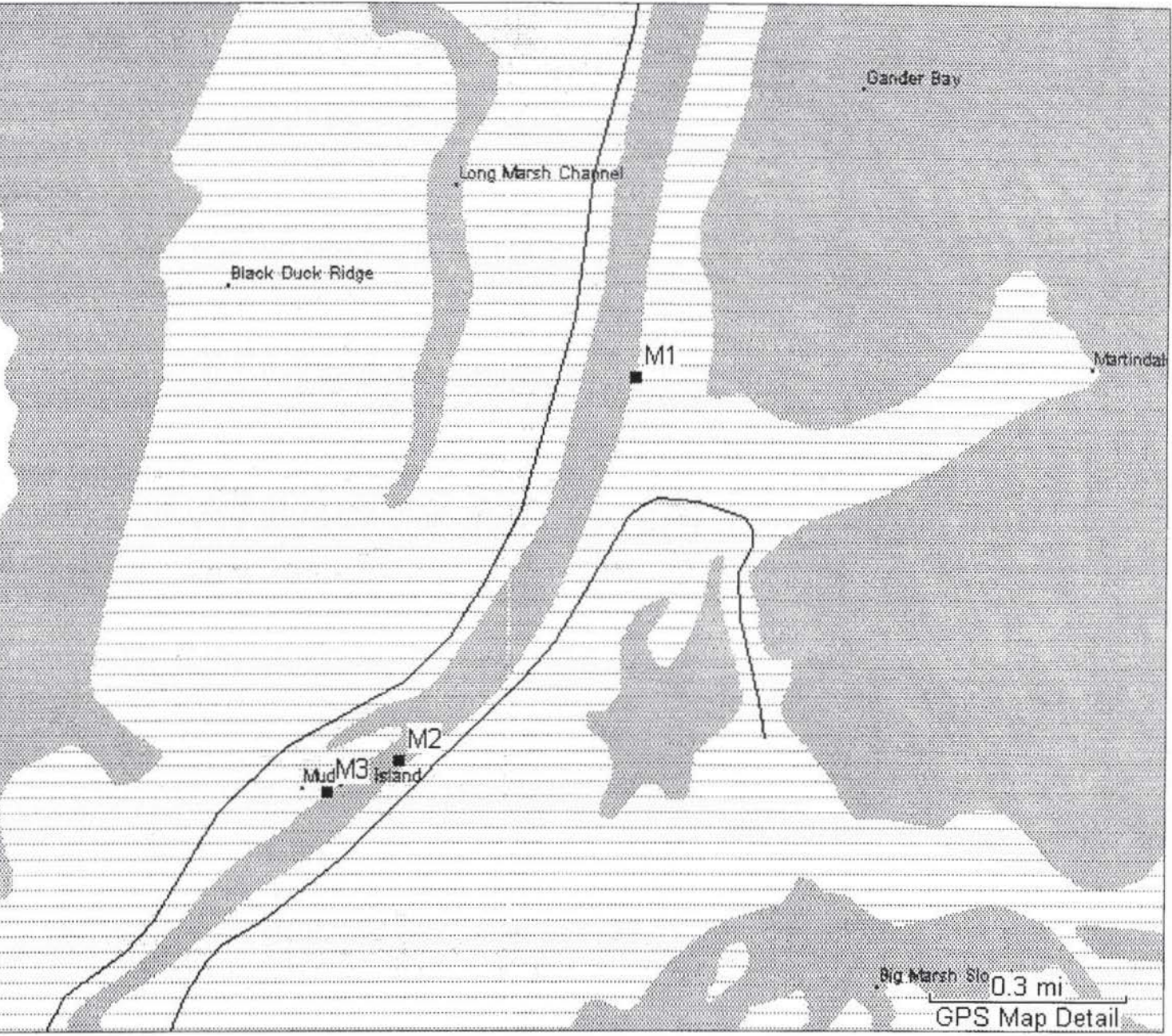
Appendix 1: Maps and Coordinate Data



Title
+ tell what
CE1
C1
M1
are


Shad Island
C1zd
C1a
C1b
East Branch Missisquoi River
C2N
C2
C29
500 ft
overzoom

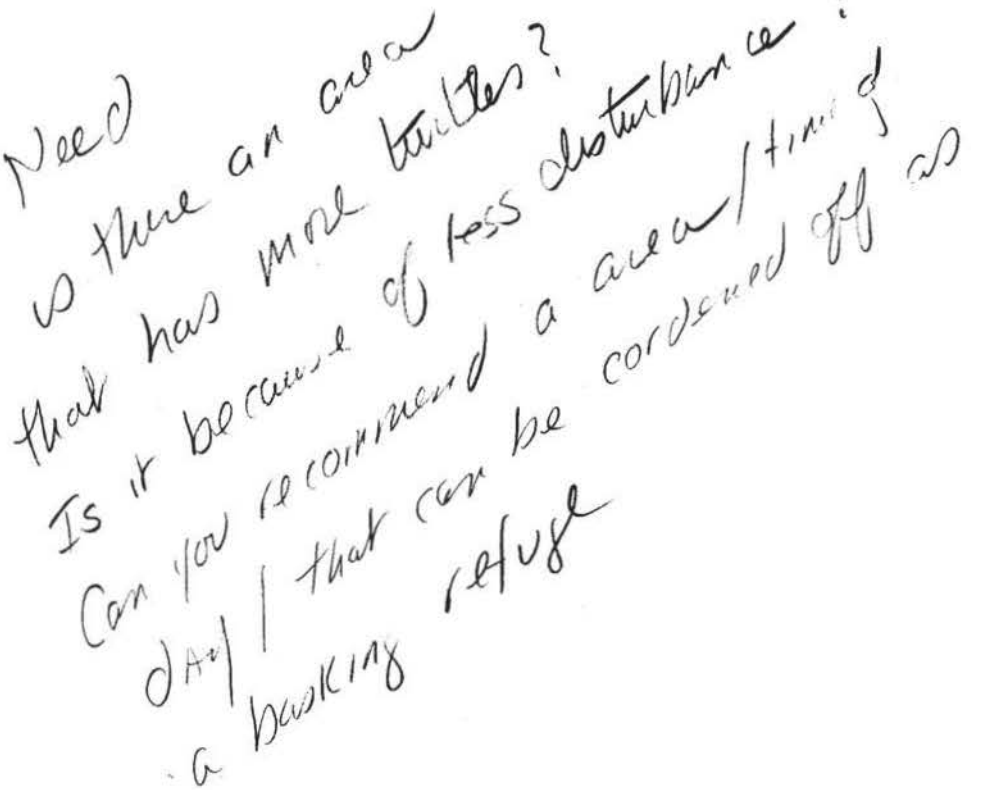

CE1c
CE1b
CE1a
120 ft
overzoom


Gander Bay
Long Marsh Channel
Black Duck Ridge
M1
Martindale
M2
M3
Mud Island
Big Marsh Slo
0.3 mi
GPS Map Detail

WGS 84 Turtle Basking Sites

Name	Description	Lat/Lon hddd.ddddd°	Lat/Lon hddd°mm.mmm'	Lat/Lon hddd°mm'ss.s"
C1a	Center Main A	N45.00675 W73.14665	N45 00.405 W73 08.799	N45 00 24.3 W73 08 47.9
C1b	Center Main B	N45.00662 W73.14745	N45 00.397 W73 08.847	N45 00 23.8 W73 08 50.8
C1zd	Center Main ZD	N45.00688 W73.14702	N45 00.413 W73 08.821	N45 00 24.8 W73 08 49.3
C2	Center Two	N45.00412 W73.14502	N45 00.247 W73 08.701	N45 00 14.8 W73 08 42.1
C2N	Center Two North	N45.00433 W73.14506	N45 00.260 W73 08.704	N45 00 15.6 W73 08 42.2
CE1a	Center East A	N44.99625 W73.14844	N44 59.775 W73 08.906	N44 59 46.5 W73 08 54.4
CE1b	Center East B	N44.99631 W73.14844	N44 59.779 W73 08.906	N44 59 46.7 W73 08 54.4
CE1c	Center East C	N44.99652 W73.14816	N44 59.791 W73 08.890	N44 59 47.5 W73 08 53.4
M1	Main 1	N44.98587 W73.15020	N44 59.152 W73 09.012	N44 59 09.1 W73 09 00.7
M2	Main 2	N44.97726 W73.15756	N44 58.636 W73 09.454	N44 58 38.1 W73 09 27.2
M3	Main 3	N44.97656 W73.15985	N44 58.594 W73 09.591	N44 58 35.6 W73 09 35.5

Appendix 2: Disturbance Records



Record # 1

Date 25.5.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 1 male(?) -~20cm long – on end of 2.5m submerged log

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:07	Mb M D	25	From ctr/east branch, 17' alum on Plane, upriver to w branch, 25mph Turtle inattentive but washed by 5 wake waves	Fs Lw Ww Ln	20	Xr, Sr
11:23	Mb M D	25	From ctr/E branch. 18' on plane, upriver main, 25 mph. Turtle inattentive but washed several times	Fs Lw Ww Ln	20	Xr, Sr
11:53	Mb M D	20	From west branch, 15' bass boat to ctr/E, not on plane, 10-15mph. Large wake washed turtle off log, returned to spot 1 min later	Ms Hw Ww Mn	25 60	Xr, Sr, ~~Ef~~ Wv

D = distance (meters); I = intensity; T = duration (s), return time(s)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wv** washed off

Wv Pv

Record # 2

Date 25.5.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 3 large female spinys

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
4:16	Ub M	7	Canoe paddled by, 7 meters or so	Ss Nw Sn	30	Er
4:16	Ub M	7	Canoe paddled by, 7 meters or so	Ss Nw Sn	30	Er
4:16	Ub M	7	Canoe paddled by, 7 meters or so	Ss Nw Sn	30	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Pr** washed off

Record # 3

Date 7.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 2 large females; 1 small male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
12:16	Ub M D	20	2 kayakers pass at 20 meters	Ss Nw Nn	30	Xr
12:20	Mb M D	20	16' motorboat at 20 m	Ms Lw Mn	20	Ar
12:20	Mb M D	20	16' motorboat at 20 m	Ms Lw Mn Ww	20	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Pr** washed off

Record # 4

Date 7.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 2-3 large female spinys

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:32	O	3	Large fish jumped within 3 meters	Ln	1	Xr
3:32	O	3	Large fish jumped within 3 meters	Ln	1	Xr
4:40	Ub M	65	Moving off in my canoe to leave from observation spot across river, being very careful	Ss Nw Nn	60	Ar
4:40	Ub M	65	Moving off in my canoe to leave from observation spot across river, being very careful	Ss Nw Nn	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Pr** washed off

Record # 5

Date 7.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 1 small male spiny

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
4:55	O	2	Muskrat swam by to within 5 ft.	Nn	15	Xr
5:00	O	1	Grackle flies by within 1 foot	Nn	3	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh)
Nw no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm)
Nn no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Pr** washed off

Record # 6

Date 9.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 3 large females, 1 small male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:39	Ub M D	40	Canoe approach	Ss Nw Nn	60 120	Ar, Er
11:56	Pb M D	20	2-person watercraft flew into channel from lake, off plane 20m from turtles	Fs Lw Ln	30 60	Ar, Wr
11:56	Pb M D	20	2-person watercraft flew into channel from lake, off plane 20m from turtles	Fs Lw Ln	30	Ar, Er
1:10	Mb M D	10	Small motorrowboat, slow male	Ss Lw Sn	30	Ar
1:10	Mb M D	10	Small motorrowboat, slow	Ss Lw Sn	30	Ar, Er
1:10	Mb M D	10	Small motorrowboat, slow	Ss Lw Sn	30	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 7

Date 9.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 2 large females, 1 small male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:14	Mb M D	10	Spiny surfaced, saw boat still there, to water	Ss Lw Sn	15	Ar, Er
1:16	Mb M D	10	Motorrow returned other direction male	Ss Lw Sn Ww	30	Ar
2:13	Ub M D	25	2-person canoe at 25 M driveby	Ss Nw Nn	180	Ar, Er
2:13	Ub M D	25	2-person canoe at 25 M driveby male	Ss Nw Nn	180	Ar
2:13	Ub M D	25	2-person canoe at 25 M driveby	Ss Nw Nn	180	Xr
3:01	Mb M D	20	15' powerboat slow driveby	Ss Lw Sn	30	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Pr** washed off

Record # 8

Date 9.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 3 large females, 1 small male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:01	Mb M D	20	15' powerboat slow driveby	Ss Lw Sn	30	Ar
3:01	Mb M D	20	15' powerboat slow driveby	Ss Lw Sn	30	Ar
3:33	Mb M D	10	Large motorboat, upstream, medium driveby male	Ms Lw Ln	60	Xr
3:33	Mb M D	10	Large motorboat, upstream, medium driveby	Ms Lw Ln	60	Ar, Pr
3:33	Mb M D	10	Large motorboat, upstream, medium driveby	Ms Lw Ln	60	Ar
3:33	Mb M D	10	Large motorboat, upstream, medium driveby	Ms Lw Ln	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 9

Date 9.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 1 large female

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
4:20	Mb M D	20	Slow motorboat upstream small wake	Ss Lw Sn	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 10

Date 10.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 2 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:45	Mb L D	15	Pontoon boat driveby, slow	Ss Nw Sn	60	Ar
1:45	Mb L D	15	Pontoon boat driveby, slow	Ss Nw Sn	60	Ar
2:04	O	3	Kingfisher plunged into water 3 times less than 3 meters from spinys	Ln	5	Xr
2:04	O	3	Kingfisher plunged into water 3 times less than 3 meters from spinys	Ln	5	Xr
2:47	Ub M Lt	50	2 kayakers, paddle by slow, watching turtles, low movement, talking – heads up at 100m.	Ss Nw Sn	180	Ar
2:47	Ub M Lt	50	2 kayakers, paddle by slow, watching turtles, low movement, talking – heads up at 100m.	Ss Nw Sn	180	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 11

Date 10.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 2 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
2:50	Ub M D	20	1st of 2 kayakers, drift by watching turtles	Ss Nw Nn	180	Ar
2:50	Ub M D	20	1st of 2 kayakers, drift by watching turtles	Ss Nw Nn	180	Xr
2:50	Ub M Lt	10	2nd of kayakers closer, loiter	Ss Nw Nn	300	Ar
2:50	Ub M Lt	10	2nd of kayakers, closer, loiter	Ss Nw Nn	300	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 12

Date 15.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 1 large female

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:55	Ub M D	3	My canoe slow float by, attentive, left	Ss Nw Nn	60	Ar, Er
2:12	Mb M D	10	Motorboat slow upstream no wake	Ss Nw Sn	60	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh)
Nw no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm)
Nn no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 13

Date 16.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer | LCI Derby Saturday

Location C1

Turtles Involved 1 - 3 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
7:40	Mb M Lt	20	Bassboat trolling and casting to shore 20 m away. After initial disturbance constant boat traffic for 50 minutes.	Ss Nw Sn A	180 50 min	Ar, Er
8:51	Mb M D	5	Motor boat downstream medium, attentive at 100m	Ms Lw Sn	60	Ar, Pr
8:57	Mb M D	5	Motor boat upstream medium speed	Ms Lw Sn	60	Ar
9:02	Mb M Lt	20	Trolling motor with standing active people, then cast into turtle area	Ss Nw Sn A	90	Ar, Er
9:52	Mb M D	10	Downstream trolling motor, driveby troll. All of a sudden spiny saw boat and into water	Ss Nw Nn A	90	Ar, Er
10:54	Ub M D	10	4 kayakers downstream, talking, slow. Attentive 40 m, to water	Ss Nw Sn	180	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 14

Date 16.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer | LCI Derby Saturday

Location C1

Turtles Involved 1-3 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
10:54	Ub M D	10	4 kayakers downstream, talking, slow	Ss Nw Sn	180	Ar, Er
10:54	Ub M D	10	4 kayakers downstream, talking, slow. Constant disturbance for next 10 min	Ss Nw Sn	180	Ar, Er
11:21	O	100	People in boat around corner talking, turtle heads up looking for	Sn	30	Ar
11:29	Mb M D	10	Downstream motor driveby	Ms Lw Sn Ww	30	Ar, Sr
11:37	Mb L D	5	Large boat upstream, medium, huge wake	Ms Hw Ln Ww	60 1[illegible]	Ar, Wr
11:37	Mb L D	5	Large boat upstream, medium, huge wake	Ms Hw Ln Ww	60	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 15

Date 16.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer | LCI Derby Saturday

Location C1

Turtles Involved 2 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:44	Mb M D	8	Trolling bassboat motors off medium, large wake. Turtles attentive from 60 m.	Ms Lw Ln Ww	45	Ar, Pr, Sr
11:44	Mb M D	8	Trolling bassboat motors off medium, large wake. Turtles attentive from 60 m.	Ms Lw Ln Ww	45	Ar
11:50	Mb L D	15	Large boat slow by	Ss Lw Ln	30	Xr
11:56	Mb M D	15	Driveby slow	Ss Nw Sn	30	Ar, Er
11:56	Mb M D	15	Driveby slow, heads down in water to "hide"	Ss Nw Sn	30	Ar
12:11	Mb M D	7	Boat upstream medium, large wake turtles attentive to noise from 100m	Ms Hw Ln Ww	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 16

Date 16.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer | LCI Derby Saturday

Location C1

Turtles Involved 3 large female, 1 small male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
12:11	Mb M D	7	Boat upstream medium, large wake turtles attentive to noise from 100m	Ms Hw Ln Ww	60	Ar, Er
12:11	Mb M D	7	Boat upstream medium, large wake turtles attentive to noise from 100m	Ms Hw Ln Ww	60	Wr
1:37	Mb M D	20	Bassboat full throttle downstream, turtles attentive at 60m	Fs Hw Ln Ww	30	Ar
1:37	Mb M D	20	Bassboat full throttle downstream, turtles attentive at 60m	Fs Hw Ln Ww	30	Ar, Wr
1:37	Mb M D	20	Bassboat full throttle downstream, turtles attentive at 60m, male	Fs Hw Ln	30	Ar
1:37	Mb M D	20	Bassboat full throttle downstream, turtles attentive at 60m	Fs Hw Ln Ww	30	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 17

Date 16.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer | LCI Derby Saturday

Location C1

Turtles Involved 3 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
2:20	Mb M D	10	Trolling bassboat upstream slow, wary from 40m	Ss Nw Nn	90	Ar
2:20	Mb M D	10	Trolling bassboat upstream slow	Ss Nw Nn	90	Er
2:20	Mb M D	10	Trolling bassboat upstream slow	Ss Nw Nn	90	Ar, Er
2:23	Mb S D	10	Trolling motorrow upsteam slow – constant disturbance in area for 25 min.	Ss Nw Ln	90	Ar, Er
3:00	Mb M Lt	15	FWS craft stopped to talk with me	Ms Lw Ln	60	Ar, Er
3:00	Mb M Lt	15	FWS craft stopped to talk with me	Ms Lw Ln	60	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 18

Date 16.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer | LCI Derby Saturday

Location C1

Turtles Involved 2 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:04	Mb M D	15	FWS boat motors off	Ms Lw Ln	30	Er
3:04	Mb M D	15	FWS boat motors off	Ms Lw Ln	30	Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 19

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 4 large females, 1 smaller female?

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:00	Ub M D	10	My canoe floating by with current, arm movement at end	Ss Nw Nn A	120	Ar
11:00	Ub M D	10	My canoe floating by with current, arm movement at end	Ss Nw Nn A	120	Ar
11:00	Ub M D	10	My canoe floating by with current, arm movement at end	Ss Nw Nn A	120	Ar
11:00	Ub M D	10	My canoe floating by with current, arm movement at end	Ss Nw Nn A	120	Ar, Er
11:00	Ub M D	10	My canoe floating by with current, arm movement at end	Ss Nw Nn A	120	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 20

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 3 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:18	Ub M Lt	25	My canoe floating by, then taking up observation station opposite	Ss Nw Nn A	90	Ar
11:18	Ub M Lt	25	My canoe floating by, then taking up observation station opposite	Ss Nw Nn A	90	Ar, Er
11:28	Ub M D	15	2 canoeists downstream	Ss Nw Sn A	240	Ar, Er
11:28	Ub M D	15	2 canoeists downstream	Ss Nw Sn A	240	Ar
11:28	Ub M D	15	2 canoeists downstream	Ss Nw Sn A	240	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 21

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 1-2 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:50	Ub M D	30	My canoe passing	Ss Nw Nn A	90	Ar, Er
12:54	Mb M D	100	Bassboat downstream motoring in, lots of talking, banging, but did not pass yet	Ln	30	Ar
12:54	Mb M D	100	Bassboat downstream motoring in, lots of talking, banging, but did not pass yet	Ln	30	Ar
1:07	Ub M D	15	As canoe passes	Ss Nw Nn A	30	Ar
1:07	Ub M D	15	As canoe passes	Ss Nw Nn A	30	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 22

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 1-4 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:28	Mb L D	20	Large motor downstream driveby, medium speed	Ms Lw Sn Ww	60	Xr, Ar
1:28	Mb L D	20	Large motor downstream driveby, medium speed	Ms Lw Sn Ww	60	Xr
1:28	Mb L D	20	Large motor downstream driveby, medium speed	Ms Lw Sn Ww	60	Xr
1:28	Mb L D	20	Large motor downstream driveby, medium speed	Ms Lw Sn Ww	60	Xr, Sr
1:59	Mb M D	20	Bassboat blows through fast, large wake upstream	Fs Hw Ln Ww	60	Xr, Sr
1:59	Mb M D	20	Bassboat blows through fast, large wake upstream	Fs Hw Ln Ww	60 1	Xr, Wr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 23

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C2

Turtles Involved 1-3 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:59	**Mb** **M** **D**	**20**	Bassboat blows through fast, large wake upstream	**Fs** **Hw** **Ln** **Ww**	**60**	**Xr**
2:35	**Pb** **S** **D**	**20**	Personal watercraft upstream fast with large wake	**Fs** **Hw** **Ln** **Ww**	**45**	**Xr, Sr**
2:35	**Pb** **S** **D**	**20**	Personal watercraft upstream fast with large wake	**Fs** **Hw** **Ln** **Ww**	**45** **1**	**Wr**

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 24

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved Up to 5 females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:40	Ub M D	40	I paddle up and by to observation point	Ss Nw Nn A	90 3	Ar, Er
3:40	Ub M D	60	I paddle up and by to observation point	Ss Nw Nn A	90	Xr
3:40	Ub M D	60	I paddle up and by to observation point	Ss Nw Nn A	90	Xr
3:40	Ub M D	60	I paddle up and by to observation point	Ss Nw Nn A	90	Xr
3:40	Ub M D	60	I paddle up and by to observation point	Ss Nw Nn A	90	Xr
3:40	Ub M D	60	I paddle up and by to observation point	Ss Nw Nn A	90	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 25

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved Up to 6 females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:54	Mb L D	100	Large fast boat to west branch, closest approach 100 m.	Ln	30	Ar, Er
3:54	Mb L D	100	Large fast boat to west branch, closest approach 100 m.	Ln	30	Xr
3:54	Mb L D	100	Large fast boat to west branch, closest approach 100 m.	Ln	30	Xr
3:54	Mb L D	100	Large fast boat to west branch, closest approach 100 m.	Ln	30	Xr
5:30	Mb L D	120	Motor boat started up 120 m off – very loud – all turtles bolted at noise	Ln	5	Er
5:30	Mb L D	120	Motor boat started up 120 m off – very loud – all turtles bolted at noise	Ln	5	Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 26

Date 25.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 5 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
5:30	Mb L D	120	Motor boat started up 120 m off – very loud – all turtles bolted at noise	Ln	5	Er
5:30	Mb L D	120	Motor boat started up 120 m off – very loud – all turtles bolted at noise	Ln	5	Er
5:30	Mb L D	120	Motor boat started up 120 m off – very loud – all turtles bolted at noise	Ln	5	Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 27

Date 27.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 2 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:54	Mb S Lt	15	Motorrow slow by fishing, casting in, basking in shallows spiny attentive to motion	Ss Nw Nn	120	Ar
3:12	Ub M D	5	I slowly blew past on air current	Ss Nw Nn	90	Ar, Er
3:12	Ub M D	5	I slowly blew past on air current	Ss Nw Nn	90	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 28

Date 30.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 1-2 large females, 1 small male?

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:10	O	1	Raccoon swam across channel, up on log, seemed to lunge at map and then spiny.	Ln	10	Er
11:43	Mb M D	15	Motorboat fast downstream, large wake. Turtle craned head just before I heard it.	Fs Hw Ln	45	Ar, Er
12:08	Mb M D	30	Same boat returns, turtles attentive at 100m	Fs Hw Ln Ww	45	Ar, Er
12:08	Mb M D	30	Same boat returns, turtles attentive at 100m	Fs Hw Ln Ww	45	Ar, Wr
1:10	Mb S D	25	Small power boat motors through fast, slows to medium in area, huge wake, attentive 60m	Ms Hw Ln Ww	15 2	Ar, Er
1:10	Mb S D	25	Small power boat motors through fast, slows to medium in area, huge wake, attentive 60m	Ms Hw Ln Ww	15	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** *loiter*

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 29

Date 30.6.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location C1

Turtles Involved 1-2 females, 1 male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:10	Mb S D	25	Small power boat motors through fast, slows to medium in area, huge wake	Ms Hw Ln Ww	15	Ar, Xr, Wr
2:31	Mb M	150	Motorboat upstream 150 m starts engine loudly, probably visible to spiny, attentive, then to water	Ln	5	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 30

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location M1

Turtles Involved 1 small female -- with fishhook embedded in mouth

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
10:56	Ub M Lt	25	As I paddled by, attentive	Ss Nw Nn	120	Ar
10:57	Ub M D	30	2 kayakers downstream	Ss Nw Nn A	100	Xr
10:58	O	2	Fish jumped and splashed loudly 2 m away -- no reaction	Ln	5	Xr
11:05	Mb L D	20	2 FWS boats on a tour, looking at turtle, very slow, no visible motion from boat, no wake	Ss Nw Sn	240	Xr
11:05	Mb L D	20	2 FWS boats on a tour, looking at turtle, very slow, no visible motion from boat, no wake	Ss Nw Sn	240	Xr
11:19	Ub M Lt	3	1 went to take photos of fishhook, to within 3 m, no movement from me, but too close, bolted	Ss Nw Nn	220	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 31

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 4 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:41	Mb L D	20	2 FWS boats on tour, watching turtles	Ss Nw Sn A	180	Ar
11:41	Mb L D	20	2 FWS boats on tour, watching turtles	Ss Nw Sn A	180	Ar
11:43	Ub M D	30	2 kayakers downstream	Ss Nw Nn A	90	Ar
11:43	Ub M D	30	2 kayakers downstream	Ss Nw Nn A	90	Ar
11:49	Mb L D	10	1 FWS boat, mediums speed, large wake	Ms Hw Ln Ww	60	Ar
11:49	Mb L D	10	1 FWS boat, mediums speed, large wake	Ms Hw Ln Ww	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** *loiter*

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 32

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved Up to 3 females, 1 male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:50	Ub M D	8	2 kayakers downstream	Ss Nw Nn A	120	Ar
11:50	Ub M D	8	2 kayakers downstream	Ss Nw Nn A	120	Ar
1:43	O	1	Grackle hopping on log, no reaction	Nn A	30	Xr
1:43	O	1	Grackle hopping on log, no reaction	Nn A	30	Xr
1:50	Mb L D	15	FWS pontoon, slow pass, watching	Ss Nw Sn A	60	Ar
1:50	Mb L D	15	FWS pontoon, slow pass, watching	Ss Nw Sn A	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 33

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 3 large female, 1 male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:50	Mb L D	15	FWS pontoon, slow pass, watching	Ss Nw Sn A	60	Ar
1:50	Mb L D	15	FWS pontoon, slow pass, watching	Ss Nw Sn A	60	Xr
1:52	Mb M D	15	FWS smaller boat, watching	Ss Nw Sn A	60	Ar
1:52	Mb M D	15	FWS smaller boat, watching	Ss Nw Sn A	60	Ar
1:52	Mb M D	15	FWS smaller boat, watching	Ss Nw Sn A	60	Ar
1:52	Mb M D	15	FWS smaller boat, watching	Ss Nw Sn A	60	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 34

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 3 females, 1 male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:56	Mb M	100	Motorboat trolling to west branch, turtles watching, attentive	Ss Sn	30	Ar
1:56	Mb M	100	Motorboat trolling to west branch, turtles watching, attentive	Ss Sn	30	Ar
2:00	O	2	Grackle hopping on log	Nn A	30	Ar
2:00	O	2	Grackle hopping on log	Nn A	30	Ar
2:21	Mb L D	15	FWS pontoon upstream medium, large wake – all washed by wake	Ms Hw Ln Ww	30	Ar
2:21	Mb L D	15	FWS pontoon upstream medium, large wake – all washed by wake	Ms Hw Ln Ww	30	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 35

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 3 females, 1 male (female with hook)

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
2:23	Mb M D	15	Smaller FWS upstream medium, large wake	Ms Hw Ln Ww	30	Ar, Wr
2:23	Mb M D	15	Smaller FWS upstream medium, large wake	Ms Hw Ln Ww	30 1	Ar, Wr
2:23	Mb M D	15	Smaller FWS upstream medium, large wake	Ms Hw Ln Ww	30	Ar
2:23	Mb M D	15	Smaller FWS upstream medium, large wake	Ms Hw Ln Ww	30	Ar
2:34	Ub M D	5	Canoe drifted by, closest 2 m, no paddling	Ss Nw Nn	60	Ar
2:34	Ub M D	5	Canoe drifted by, closest 2 m, no paddling	Ss Nw Nn	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 36

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 3 females, 1 male

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
2:34	Ub M D	5	Canoe drifted by, closest 2 m, no paddling	Ss Nw Nn	60	Ar, Er
2:34	Ub M D	5	Canoe drifted by, closest 2 m, no paddling	Ss Nw Nn	60	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 37

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location M2

Turtles Involved 2 large females?

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:09	Ub M D	15	Canoe driftby, no paddle	Ss Nw Nn	60	Ar
3:09	Ub M D	15	Canoe driftby, no paddle	Ss Nw Nn	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 38

Date 2.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location M3

Turtles Involved 2 Females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
3:15	Ub M D	5	Driftby close	Ss Nw Nn	90	Ar, Er
3:15	Ub M D	5	Driftby close	Ss Nw Nn	90	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 39

Date 6.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 1 large female

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
1:31	Ub M D	10	Canoe drift by	Ss Nw Nn	15	Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 40

Date 7.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 3 large females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
11:42	Ub M D	10	Canoe driftby	Ss Nw Nn	60	Ar, Er
11:42	Ub M D	10	Canoe driftby	Ss Nw Nn	60	Ar
11:42	Ub M D	10	Canoe driftby	Ss Nw Nn	60	Ar
11:47	Mb M D	15	Motorrow upstream, medium speed, small wake, all attentive from 50m	Ms Lw Sn Ww	60	Ar
11:47	Mb M D	15	Motorrow upstream, medium speed, small wake	Ms Lw Sn Ww	60	Ar
11:47	Mb M D	15	Motorrow upstream, medium speed, small wake	Ms Lw Sn	60	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 41

Date 7.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved Up to 3 females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
12:10	Ub M D	20	3 kayakers, slow paddleby	Ss Nw Nn A	45	Ar
12:10	Ub M D	5	3 kayakers, slow paddleby	Ss Nw Nn A	45	Ar, Er
12:10	Ub M D	5	3 kayakers, slow paddleby	Ss Nw Nn A	45	Ar, Er
1:48	Ub M D	30	1 kayaker, slow paddleby downstream	Ss Nw Nn A	30	Ar, Er
1:48	Ub M D	30	1 kayaker, slow paddleby downstream	Ss Nw Nn A	30	Ar, Er
1:48	Ub M D	30	1 kayaker, slow paddleby downstream	Ss Nw Nn A	30	Ar

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 42

Date 7.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 2 Females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
2:00	Ub M D	25	Canoe downstream	Ss Nw Nn A	120	Ar
2:00	Ub M D	25	Canoe downstream	Ss Nw Nn A	120	Ar, Er
2:11	Mb M D	30	Motor downstream medium to fast, large wake	Fs Hw Ln Ww	60 1	Ar, Wr
2:11	Mb M D	30	Motor downstream medium to fast, large wake	Fs Hw Ln Ww	60	Ar
2:39	Mb M D	20	Motorrow downstream, trolling, no wake, both attentive at 50 m	Ss Nw Nn	60	Ar
2:39	Mb M D	20	Motorrow downstream, trolling, no wake, both attentive at 50 m	Ss Nw Nn	60	Ar, Er

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash.

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off

Record # 43

Date 7.7.2001

Eastern Spiny Softshell Turtle Disturbance Record
Missisquoi River - May to July 2001

Observer(s) W. Max Meyer

Location CE1

Turtles Involved 2 females

Time	Source	D(m)	Disturbance Description	I	T(s)	Turtle Reaction
2:44	Ub M D	40	Kayaker slow upstream watching turtles	Ss Nw Nn	180	Ar
2:44	Ub M D	40	Kayaker slow upstream watching turtles	Ss Nw Nn	180	Ar
2:48	Ub M D	50	2 kayakers slow upstream talking	Ss Nw Nn A	120	Ar
2:48	Ub M D	50	2 kayakers slow upstream talking	Ss Nw Nn A	120	Ar
2:52	Ub M D	30	3 kayakers pass upstream paddling slowly and quietly	Ss Nw Nn A	90	Xr
2:52	Ub M D	30	3 kayakers pass upstream paddling slowly and quietly	Ss Nw Nn A	90	Xr

D = distance (meters); I = intensity; T = duration (seconds), return time(min)

Sources → **Mb** gas-motorized boat; **Eb** electric-motorized boat; **Ub** unmotorized boat; **Pb** personal watercraft; **O** other; **S,M,L** size (<3m, 3-6m, >6m); **D** driveby; **Lt** loiter

Intensity → **Ss** slow; **Ms** medium; **Fs** fast (<10km/h, 10-20km/h, >20kmh) **Nw** no wake; **Lw** low wake; **Hw** high wake (<10cm, 10-20cm, >20cm) **Nn** no noise; **Sn** some noise; **Ln** loud noise; **Wm** wake motion; **Ww** wake wash

Reaction → **Xr** no reaction; **Ar** attentive to disturbance; **Pr** preparative; **Er** evacuation reaction; **Sr** stabilizing reaction; **Wr** washed off