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Survival and Movement of Hatchery-Reared Fall Yearling Landlocked Salmon In Two Northern Maine Streams

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ABSTRACT

Interest in stocking programs utilizing older, larger hatchery salmonids is becoming more popular with Maine anglers, but little information exists regarding the survival of these fish and their tendency to remain in targeted stream reaches. Fall yearling landlocked salmon (FY LLS) were stocked in two northern Maine streams and tracked using radio telemetry to determine survival and movement. Overall survival of FY LLS was adequate to support a sport fishery, but movement out of the stream reaches varied substantially. Fish stocked at upstream locations and sites with larger, deeper pools were more likely to remain near the stocking sites.

KEY WORDS: LLS, STOCKED SALMON, HATCHERY FISH MOVEMENT, HATCHERY FISH SURVIVAL, RADIO TELEMETRY

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SUMMARY

Hatchery-reared fall yearling landlocked salmon (FY LLS) were stocked at multiple locations in Scopan Stream (a tributary to the Aroostook River) near Masardis, Maine, and the lower Fish River (a tributary to the St. John River) near Fort Kent in October 2013. A subset (n=28) of these fish were radio tagged and monitored during 13-14 subsequent tracking events primarily throughout the winter of 2013-14. Survival of radio tagged fish appeared to be relatively high, exceeding 80% at three weeks post-stocking and 40% five months post-stocking.

Movement of fish stocked in both streams was primarily in a downstream direction, but it was highly variable and dependent on stocking site. Fish stocked at the uppermost site in Scopan Stream, which contains large, deep pool habitat, remained in the stream for months, while fish stocked at the lower site left the stream within 24 hours and moved down the Aroostook River. Severe streamflow fluctuation resulting from hydropower production in Scopan Stream during early January resulted in the remaining tagged fish leaving the stream.

In the Fish River, FY LLS stocked at the uppermost site remained in the river longer than those stocked at the lower two sites. Overall, a majority of tagged fish moved downstream to a discrete location in the St. John River during winter.

Results from this study suggest that FY LLS survive and remain near stocking sites at adequate levels to support recreational fisheries in these two streams, with some exceptions. Specific stocking locations and other caveats should be examined to improve survival and retention. Future work should focus on evaluating the catchability of these FY LLS, and the sport fisheries that develop as a result of stocking.

INTRODUCTION

The stocking of older, larger hatchery salmonids has greatly improved angler use and fishing quality in many Maine waters, but results of such programs have been highly variable (Ashe et al. 2013). Success of stocking programs are dependent on fish surviving for a meaningful time period post-stocking and remaining in the stocked water body for anglers to catch them. Such assumptions are often violated in stream systems, where post-stocking fish movement and mortality can be substantial (Cresswell 1981; High and Meyer 2009).

In 2013, we implemented a fall yearling landlocked salmon (FY LLS) stocking program in two northern Maine streams, attempting to provide a unique year-round angling opportunity. We used radio telemetry to monitor the survival and movement of stocked fish to determine how long they would remain catchable to anglers.

STUDY AREA

Scopan Stream

Scopan Stream (formerly Squapan Stream) is a short, medium sized stream in the town of Masardis, Aroostook County, Maine. Much of the stream's historic length has been impounded by Scopan Dam, a 20 foot high hydropower dam that controls the water level of 5,000–acre Scopan Lake, as well as streamflow in the tailwater. From Scopan Dam the stream flows approximately 3.5 miles before joining the Aroostook River near the Masardis/Ashland town line.

The aquatic habitat in Scopan Stream is highly degraded, primarily as a result of severe streamflow fluctuations resulting from hydropower production. During the wintertime production season (typically January-March), hydropower flows are released 5 days a week, and commonly result in a range of flows between less than 20 cfs (cubic feet per second) to greater than 600 cfs in a matter of minutes. The resulting stream habitat is characterized by large stretches of over-widened, shallow stream channel with little to no tree cover and expanses of grassy hummocks.

Federal Energy Regulatory Commission dam relicensing resulted in mitigation measures aimed at restoring the stream channel to a more natural form. Significant stream restoration work in 2000, including cabled logs, rock weirs, and large boulder clusters has improved the quality of fish habitat in some stream reaches. However, the severe flow fluctuations and elevated summertime temperatures have prevented the stream from supporting a salmonid population in recent decades.

Fish River

The Fish River and its chain of lakes support world class fishing for brook trout, togue and landlocked salmon (LLS). For decades the Fish River Falls, located near the mouth of the river in Fort Kent, have prevented invasive muskellunge and smallmouth bass from entering the watershed. Below the falls a 5.5-mile stretch of water contains numerous riffles and deep pools; classic quality salmonid habitat. The presence of muskellunge and smallmouth bass in this reach, however, has severely impacted recruitment of LLS and brook trout such that principal fisheries for salmonids have been absent in the lower river for more than a decade.

METHODS

With no opportunity for wintertime angling in area streams and some potential salmonid habitat available and unutilized, we identified Scopan Stream and the lower Fish River as candidates for fall yearling stocking programs. On October 16, 2013 we stocked 350 FY LLS (radio-tagged = 12) at two locations in Scopan Stream (Figure 1), and 650 FY LLS (radio-tagged = 16) at three locations in Fish River (Figure 2). In 2014 we implemented regulation changes to allow year-round angling in these streams.

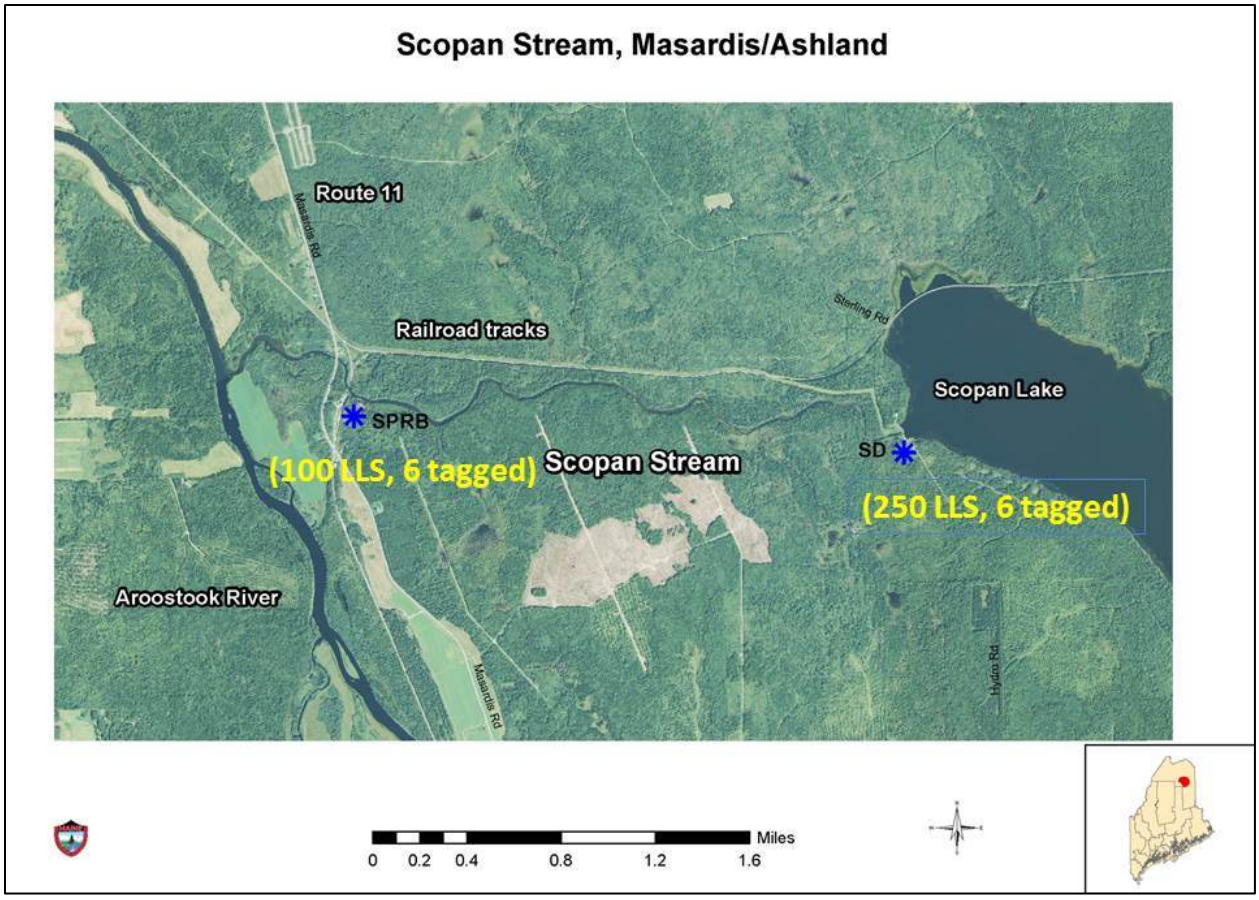

Figure 1. Site locations and number of FY LLS stocked into Scopan Stream, Fall 2013. Two hundred fifty LLS released (6 tagged) at the upper site, Scopan Dam (SD); one hundred released (6 tagged) at the lower site, Railroad Bridge (SPRB).

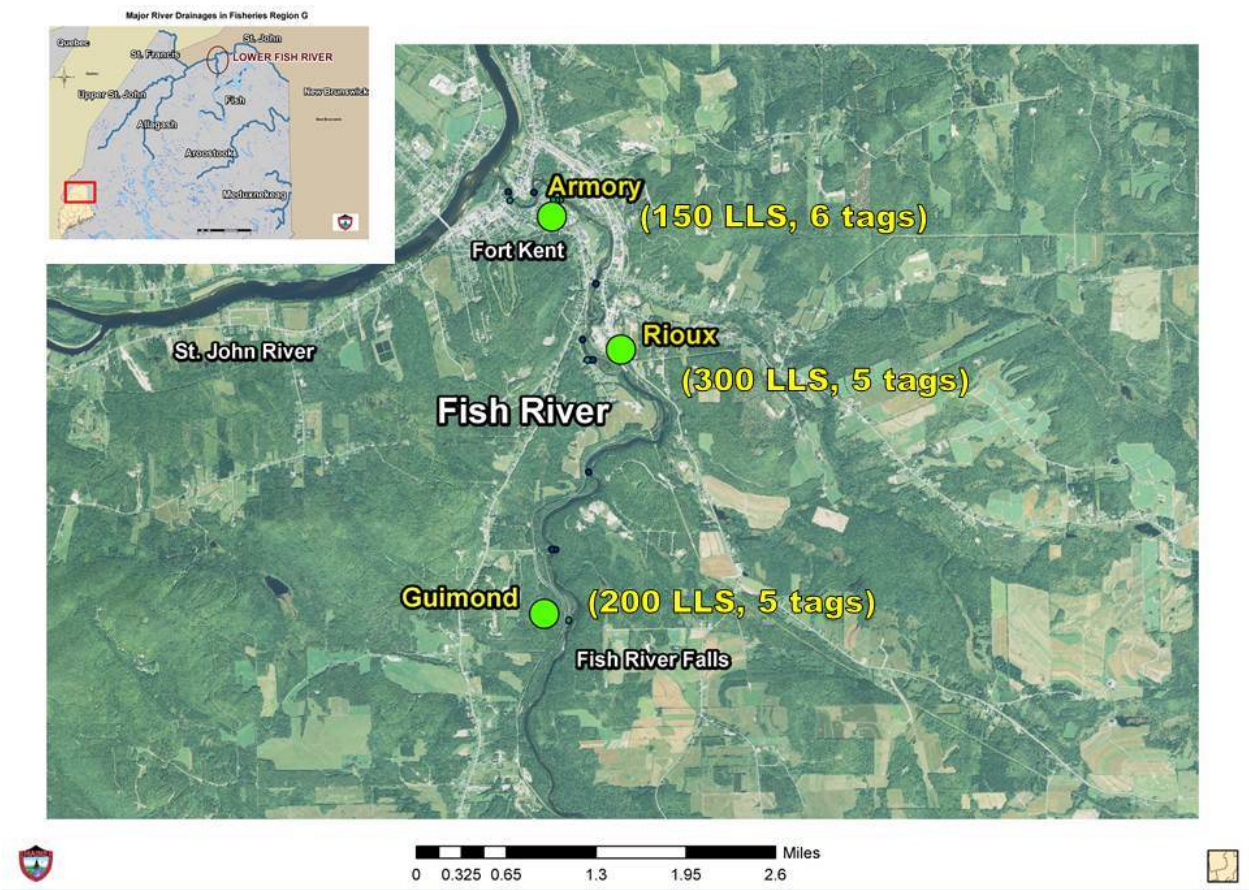

Figure 2. Site locations and number of FY LLS stocked into the lower Fish River, Fall 2013. Two hundred released (five tagged) at the upper site, Guimond; three hundred released (five tagged) at the middle site, Rioux; one hundred fifty released (six tagged) at the lower site, Armory.

We used radio telemetry to determine survival and movement of FY LLS stocked in each of these streams. One week prior to stocking, we surgically implanted radio transmitters (Advanced Telemetry Systems model F1580) in 28 FY LLS at the Maine Department of Inland Fisheries & Wildlife's Enfield Rearing Station. These fish were monitored for several days to ensure post-surgery survival. At the time of stocking, tagged fish were held separately, identified individually, and stocked along with the scheduled fish at each site.

In Scopan Stream, FY LLS averaging 11 inches and marked with an adipose fin clip were stocked at two sites. The upper site (Scopan Dam) was stocked with 250 FY LLS, the lower site (RR Bridge) was stocked with 100 fish (Figure 1). Six radio tagged fish were stocked at each site. Fish were tracked during 13 separate sampling events following stocking, with varying levels of effort, location coverage, and tracking methods (Table 1).

In the Fish River, FY LLS averaging 11 inches and marked with an adipose fin clip were stocked at three sites between Fish River Falls and the mouth of the river in Fort Kent (Figure 2). Sixteen of the radio tagged fish were divided and stocked among the three sites. Fish were tracked during 14 separate sampling events post-stocking, with varying levels of effort, location coverage, and tracking methods. The last four tracking events, in June and August 2014, were so far removed in time from the stocking date and other tracking events, that information gained from these samples had limited value and was not used in all analyses. Radio transmitters were not equipped with mortality switches, therefore changes in tag locations were used to inform judgement on whether individual FY LLS were likely still alive at specific dates.

Table 1. Summary of radio tracking events, Scopan Stream FY LLS, 2013-14.

Date	Water	Location	Activity	# Tags located (of 12)
10/17/2013	Scopan Stream	Scopan Dam to Aroostook River	float tracking	8
10/23/2013	Scopan Stream	Scopan Dam to Aroostook River	float tracking	6
10/24/2013	Aroostook River	Masardis launch to Ashland launch	float tracking	1
10/30/2013	Scopan Stream	Scopan Dam, Scopan RR bridge	spot checks on foot	5
10/31/2013	Aroostook River	Oxbow to St. John River	airplane tracking	5
11/5/2013	Aroostook River, Scopan Str.	Oxbow to St. John River	airplane tracking	10
11/6/2013	Scopan Stream	Scopan Dam to Aroostook River	float tracking	5
12/10/2013	Scopan Stream	spot check at dam	spot checks on foot	5
12/23/2013	Scopan Stream	spot check at dam	spot checks on foot	5
12/24/2013	Aroostook River, Scopan Str.	Scopan Dam to St. John River	airplane tracking	7
1/13/2014	Scopan Stream	spot check at dam	spot checks on foot	0
1/24/2014	Aroostook River, Scopan Str.	Scopan Dam to St. John River	airplane tracking	7
3/19/2014	Aroostook River, Scopan Str.	Scopan Dam to St. John River	airplane tracking	7

Table 2. Summary of radio tracking events, Fish River FY LLS, 2013-14.

Date	Water	Location	Activity	# tags located (of 16)
10/17/2013	Fish River	stocking sites	spot checks on foot	9
10/22/2013	Fish River	FR Falls to mouth of river	float tracking	8
10/29/2013	Fish River, St. John River	FR Falls to Grand Falls, NB	airplane tracking	11
11/5/2013	Fish River, St. John River	FR Falls to Frenchville	airplane tracking	15
11/7/2013	Fish River, St. John River	FR Falls to Frenchville	float and truck tracking	15
12/24/2013	Fish River, St. John River	FR Falls to Frenchville	airplane tracking	10
1/24/2014	Fish River, St. John River	FR Falls to Frenchville	airplane tracking	9
2/19/2014	Fish River, St. John River	lower Fish River to Frenchville	truck tracking	6
3/19/2014	Fish River, St. John River	FR Falls to Frenchville	airplane tracking	10
3/26/2014	Fish River, St. John River	lower Fish River to Frenchville	truck tracking	6
6/2/2014	Fish River	FR Falls to mouth of river	float tracking	4
6/3/2014	St. John River	Fort Kent to Frenchville	float tracking	2
8/13/2014	Fish River	FR Falls to mouth of river	float tracking	3
8/15/2014	Fish River, St. John River	FR Falls to Grand Falls, NB	float tracking	7

Radio tracking began the day after fish were stocked and continued throughout the winter. Fish were tracked via foot travel, canoe, vehicle and aircraft, and their locations were marked using GPS waypoints. Individual fish movement was determined by measuring the distance between each previously known location, and survival was estimated based on movement or lack of movement over the course of several tracking events. If an individual tag displayed no movement after three consecutive tracking events, and did not resume movement for the remainder of the study, it was considered a fish mortality and removed from the analysis of live fish.

RESULTS

Scopan Stream

Retention of fish in stocking area

Fall yearling LLS stocked in Scopan Stream exhibited substantial variation in movement, which appeared to be directly related to stocking location and streamflow fluctuations. Four of the twelve tagged fish left the stream within 24 hours of being stocked, indicating abrupt downstream movement by a relatively large percentage of stocked fish (Figure 3). However, that number stabilized and five tagged fish remained in the stream for approximately 2.5 months. Increased stream flows following the first post-stocking hydropower release from Scopan Dam (around January 5, 2014) resulted in all of the remaining tagged fish moving out of the stream (Figure 3).

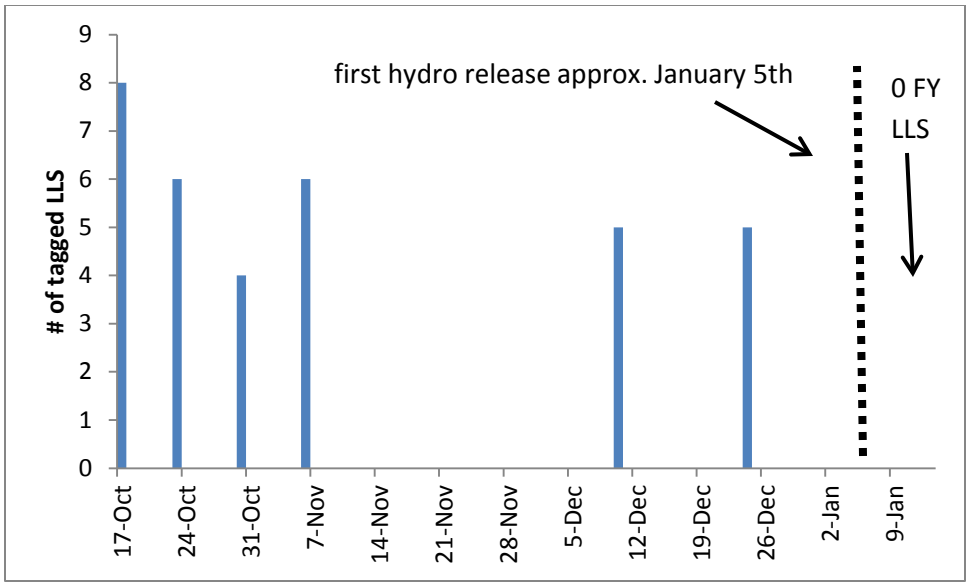

Figure 3. Number of radio tagged FY LLS identified in Scopan Stream, 2013-2014.

Retention of FY LLS in Scopan Stream was directly related to stocking site. A large percentage (5/6) of tagged fish stocked at the dam remained in the stream until the January hydropower release, while almost all tagged fish stocked at the railroad bridge site left the stream within one week (Figure 4). Fish stocked at the dam site tended to stay, or exhibited a short downstream move to a beaver dam and returned to the stocking location. The dam site contains a large, deep pool that can hold a large number of fish. Most of the fish stocked at the railroad bridge site quickly dispersed and were found scattered throughout the Aroostook River a few weeks later. Habitat at the railroad bridge site appeared to be more marginal with fewer deep pools.

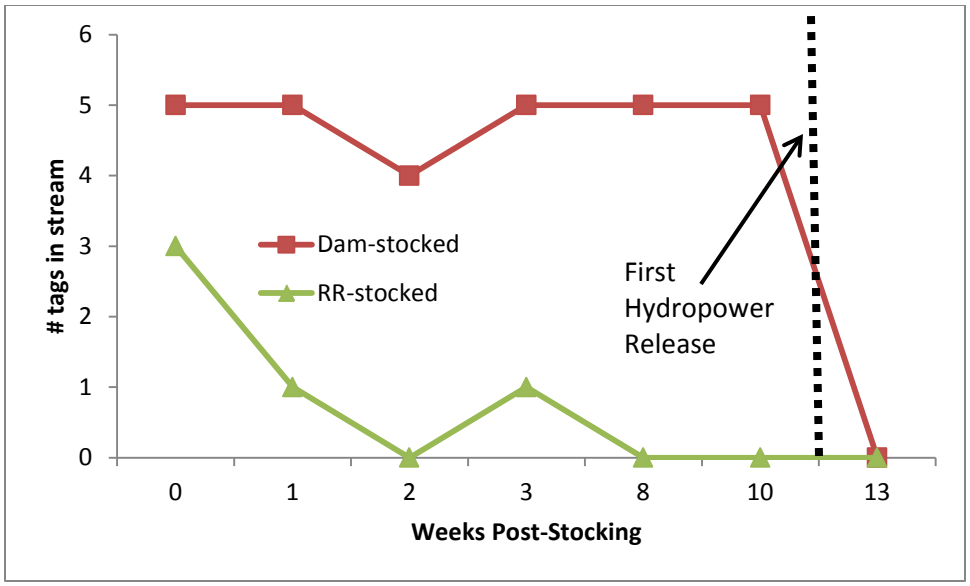

Figure 4. Number of tagged FY LLS remaining in Scopan Stream by stocking site and weeks post-stocking.

Movement patterns

Tagged FY LLS released in Scopan Stream exhibited several different patterns of individual movement (Table 3). Distinct movement patterns were also noted between the two stocking locations. At the lower release site (railroad bridge) one fish migrated downstream within 24 hours of stocking and was next located 68 miles downstream of the stocking site below Tinker Dam on the Aroostook River. Another moved short, steady distances downstream over time. Finally, three fish that initially moved 20-26 miles downstream of the stocking site subsequently moved 16-25 miles upstream. One FY LLS stocked at the railroad bridge actually migrated more than 20 miles down the Aroostook River, then returned to Scopan Stream and moved all the way upstream to Scopan Dam. Tagged fish at the upper site (Scopan Dam) stayed within .5 miles of the release site until the first hydropower release in January. Hydropower production flows in January appeared to trigger extreme movements of tagged fish downstream into slower water in the Aroostook River. None of the tagged fish moved up the Aroostook River above the mouth of Scopan Stream.

Table 3. Movement of tagged FY LLS stocked in Scopan Stream during post-stocking radio tracking events, 2013-2014.

	Tag #	Movement								pre-hydro release		post-hydro release		
		17-Oct	**23-Oct**	**24-Oct**	**30-Oct**	**31-Oct**	**5-Nov**	**6-Nov**	**10-Dec**	**23-Dec**	**24-Dec**	**13-Jan**	**24-Jan**	**19-Mar**
Scopan Dam	**111**	nm	nm		nm		nm	nm	nm	nm		NF	NF	NF
	151	↓0.5	↑0.5		nm		nm	nm	nm	nm		NF	↓12.3 mi	↓2.3 mi
	211	↓0.5	↑0.5		nm		nm	NF	nm	nm		NF	↓9.3 mi	↓6.0 mi
	291	↓0.5	↑0.2			NF	↑0.3	nm	nm	nm		NF	↓10.0 mi	↓8.0 mi
	302	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF
	362	nm	nm		nm		nm	NF	nm	nm		NF	↓11.0 mi	↓2.0 mi
Scopan RR bridge	**182**	↓0.5	NF			↓21.4	↑24.6	NF	NF		NF	NF	NF	NF
	192	NF		↓7.8		↓37.3	↓6.0	NF	NF		↓12.5 mi		nm	nm
	241	nm	NF			↓25.7	↑20.6				NF	NF	↑2.5 mi	↑1.0 mi
	332	NF				↓68.3	nm				NF	NF	NF	NF
	342	NF				↓19.8	↑16.0				NF	NF	NF	NF
	381	nm	nm	nm	nm		nm	nm			nm	nm	nm	nm

distance in miles from last known location ↑ = upstream ↓ = downstream
nm=no movement
NF=tag not found when searching in likely area

Overall survival

While difficult to determine accurately, overall survival of tagged FY LLS appeared to be relatively high. Comparing changes in fish location between tracking events allowed us to make estimates of tagged fish mortality over time. We determined that by the end of the study period, 5 months post-stocking, 5 of the 12 tagged FY LLS (40%) were likely still alive (Figure 5).

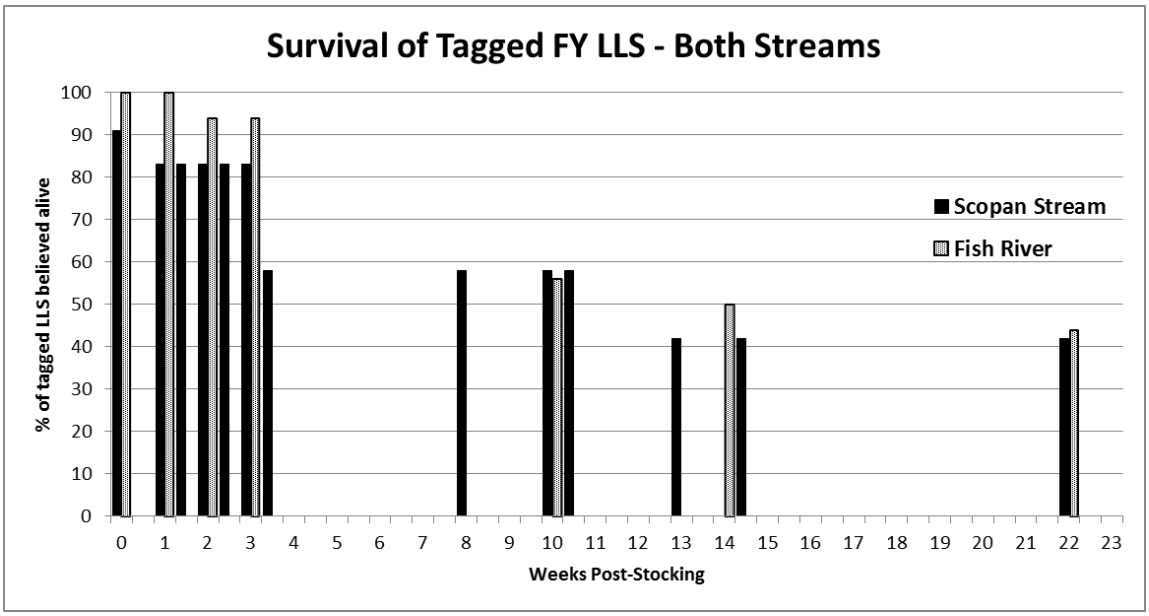

Figure 5. Percent of tagged FY LLS believed to be alive during periodic post-stocking tracking events, 2013-14.

Fish River

Retention of fish in stocking area

Fall yearling LLS stocked in the Fish River appeared to spread throughout the lower Fish River and into a distinct segment of the St. John River between Fort Kent and Frenchville post-stocking (Figure 6). Three weeks post-stocking, roughly half of the tagged FY LLS remained in the lower Fish River (Table 4). By early winter, however, the majority of the fish had left the river. Virtually all of the tagged fish that left the Fish River were found congregated within an eight to ten mile reach of the St. John River between Fort Kent and Frenchville (Figure 6). Most of the FY LLS remained in this reach of river throughout the winter.

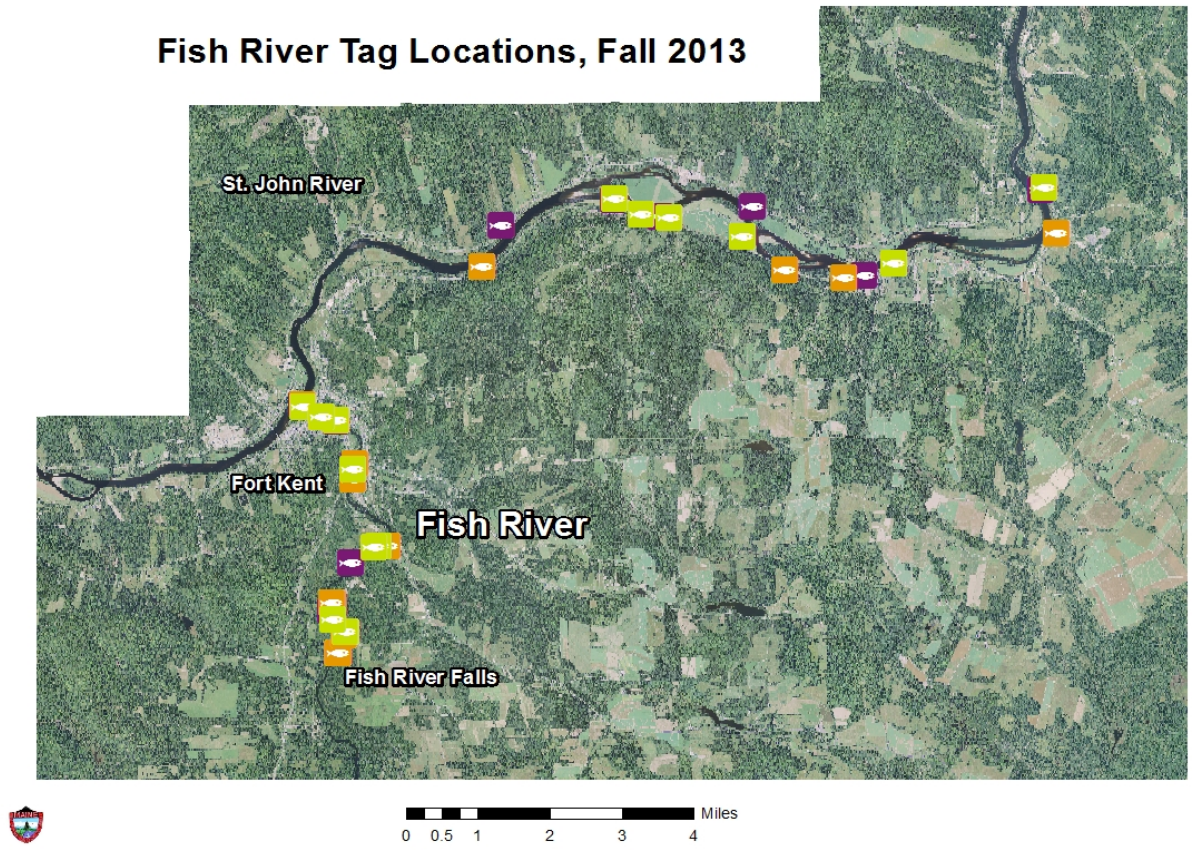

Figure 6. Locations of radio tagged FY LLS stocked in the Fish River during the first three tracking events, October-November 2013.

Movement out of the Fish River varied substantially by site stocked. Fish stocked at the upper-most site had a much greater tendency to remain in the river, while very few of those stocked at the lower site stayed (Table 4). In addition, some fish that moved downstream and out of the Fish River were later found back in the river during subsequent tracking events.

Movement patterns

Fish movement appeared to be characterized by numerous short (0-2 mile) up and downstream movements, with several significant downstream movements (8-12 miles) from the Fish River to the St. John River (Table 5). None of the tagged fish were located in the St. John River upstream from the mouth of the Fish River, and none were found in the Fish River upstream of the Fish River Falls. Very few fish were located in the St. John River downstream from the town

of Frenchville, particularly early in the study, indicating minimal downstream movement in the St. John River.

Table 4. Number of tagged FY LLS remaining in the Fish River post-stocking, by site stocked, 2013-2014.

Date	Duration (weeks post-stocking)	Total # in river (n= 16)	Guimond (upper, n= 5)	Rioux (middle, n= 5)	Armory (lower, n=6)
10/22/2013	1	8	4	3	1
10/29/2013	2	6	3	3	0
11/7/2013	3	10	4	3	3
12/24/2013	10	3	2	0	1
1/24/2014	14	2	2	0	0
3/19/2014	22	1	1	0	0

Overall survival

Survival of FY LLS stocked in the Fish River appeared to be very high. Greater than 90% of the tagged FY LLS were believed to still be alive three weeks post-stocking (Figure 5). This number fell to about 50% at 10-14 weeks into the study. Though very difficult to estimate accurately, subsequent movement data indicated that as many as 40% of the stocked fish may have still been alive in March 2014, five months post-stocking.

Table 5. Movement of tagged FY LLS stocked in the Fish River during post-stocking radio tracking events, 2013-2014.

	Tag #	Movement							
		17-Oct	**22-Oct**	**29-Oct**	**5-Nov**	**7-Nov**	**24-Dec**	**24-Jan**	**19-Mar**
Guimond	**162**	↓3.0	↓0.6	nm	↑3.8	nm	NF	NF	NF
	172		↓0.7	nm	nm	nm	NF	NF	NF
	222	nm	↓0.7		nm	↓1.5	↓1.1	nm	nm
	281				↓5.3	NF	NF	NF	NF
	311		↓1.5	nm	↓2.0	nm	↑0.6	↑1.4	↓2.2
Rioux	**141**			↓9.5		nm	nm	nm	nm
	202	nm		↓7.1	nm	↓2.2	↑1.4	nm	nm
	273	nm	nm	↓2.3	↑0.9	nm	↓9.8	↓2.0	nm
	321	nm	↓0.2	↑2.0	↑0.8	nm	NF	NF	NF
	371		↓2.1	↓1.4	↑0.8	↓1.6	NF	NF	NF
Armory	**121**	nm	↓0.4		nm	nm	↓8.5	NF	nm
	131			↓9.4	↓1.0	↓0.7	nm	nm	nm
	234	nm	NF	↓11.5	nm	↓0.7	NF	NF	NF
	252	nm	NF		↑1.2	nm	nm	nm	nm
	261	↓0.7	NF	↓14.8	↑0.5	nm	↑3.0	↓2.0	↓1.3
	351			↓7.5	↑11.6	↓12.0	nm	nm	nm

distance in miles from last known location

nm=no movement ↑ = upstream ↓ = downstream

NF=tag not found when searching in likely area

DISCUSSION

Fall yearling stocking programs are becoming increasing popular and therefore are a more commonly employed tactic among fisheries managers, but evaluation of these fisheries post-stocking has been somewhat limited to date. The purpose of this study was to determine whether stocked fall yearling landlocked salmon survived and remained in stream reaches at an appropriate level to support unique, limited fisheries.

Survival

Survival of fish for a meaningful period of time following stocking is critical to the success of any stocking program. Post-stocking survival of FY LLS in both study streams appeared to be quite high, from more than 80% three weeks post-stocking, to 40-50% roughly three months post-stocking. Surprisingly, survival appeared to remain over 40% in both areas by March 2014, five months post stocking. Though some studies have shown similar patterns in survival (Runge et al. 2008, Quinn and Kwak 2011), others have shown post-stocking, and especially overwinter, survival of hatchery fish in streams to be much lower (Schuck 1948; Miller 1952; Bettinger and Bettoli 2002).

The accuracy of survival estimates using radio telemetry in large stream systems is questionable. In this study, survival was estimated using changes in location between tracking events. Salmonids can often remain immobile in streams for long periods of time (Gerking 1959) and tag expulsion is common (Chisholm and Hubert 1985), therefore our determination of mortality based on lack of movement may have been an overestimate. On the other hand, using changes in tag locations to determine if a study fish remained alive may have been an even greater source of error. It is possible that stream currents may have moved tags downstream, incorrectly suggesting that a dead fish remained alive. Additionally, large muskellunge in the Fish River system could have preyed upon tagged FY LLS and retained tags in their stomachs or digestive tracts. If so, movement of these muskellunge prior to tag expulsion would suggest that those tagged FY LLS were alive when they were in fact dead. Notwithstanding these potential errors, estimated survival rates appear adequate to support a sport fishery.

Movement

The assumption that fish remain in a target reach is as critical to the success of a stocking program as survival. In both the Fish River and Scopan Stream, FY LLS movement was highly variable and dependent upon stocking site and other habitat characteristics.

In Scopan Stream, the majority of FY LLS stocked at the lower site left the stream immediately and migrated long distances down the Aroostook River. Though some of these fish ventured

back up the Aroostook River, most did not return to Scopan Stream. Habitat in the lower end of Scopan Stream is dominated by wide, shallow pools and riffles, and is probably not suitable to retain FY LLS for long periods of time. The dam site, however, retained fish for several months, indicating that the large, deep pool habitat immediately downstream from the dam is suitable for holding FY LLS. Based on this information, near-term FY LLS stocking in Scopan Stream should be focused on the dam site.

Though stocking FY LLS is likely to provide a limited fishery in Scopan Stream near the dam, alternative methods may be necessary in order to provide a fishery downstream from there. Scopan Stream has a history of habitat degradation due to extreme flow fluctuations for hydropower production. Future hydro relicensing agreements may provide the opportunity to construct larger, deeper pools that would hold FY LLS in reaches downstream from the dam during the fall. This study showed that wide streamflow fluctuations due to wintertime hydropower production triggered noticeable downstream movement of tagged FY LLS. Tagged fish were shown to have left Scopan Stream in January, essentially eliminating angling opportunities after December. It may be possible to negotiate the details of future dam operations to minimize flow-related impacts to fish retention in the stream.

Several other options could be explored to enhance angling opportunity in Scopan Stream and immediately downstream. Opening the Aroostook River to year-round fishing between Masardis and Washburn would allow anglers to catch FY LLS that exit Scopan Stream and remain in this stretch of river. Another option would be to stock FY brook trout in the lower reaches of Scopan Stream with the hopes that these fish may be more likely to remain in the stream. As with any alternatives, these strategies would require consideration of potential impacts to wild and native fish in the Aroostook River drainage.

In contrast to Scopan Stream, the lower Fish River is a larger stream with numerous slow, deep pools that are conducive to holding FY LLS. In addition, the Fish River does not experience the extreme flow fluctuations that Scopan Stream does. However, many FY LLS stocked in the Fish River left in early winter to occupy an 8-10 mile reach of the St. John River downstream from the mouth of the Fish River. Though the specific reason is currently unknown, it appears that this reach of the St. John River provides suitable wintering habitat for FY LLS as location data indicates many of them survived here for a long period of time.

Fall yearling LLS in the Fish River appear capable of supporting a successful sport fishery for at least 2-3 months after stocking, but many of these fish are likely to move downstream in early winter. To ensure a greater number of these fish remain in the Fish River, stocking should be concentrated on the upper two sites, particularly the uppermost site near the Fish River Falls, as fish released at this site were most likely to remain in the river.

Based on the findings of this study that stocked FY LLS have the tendency to move into a distinct reach of the St. John River, a future FY LLS fishery in the Fish River should also include angling in the St. John River between Fort Kent and Frenchville. The river is already open to fishing in October and November, so fishing regulation changes would not be necessary to encourage this fishery. However, anglers looking to catch these fish may need to be informed of their likely locations.

Overall, survival and retention of FY LLS stocked in the lower Fish River and Scopan Stream appear adequate to support an enhanced fishery with some minor adjustments to stocking sites and consideration of fish movement patterns. However, another important element to the creation of a new fishery is whether anglers actually target and effectively catch these fish. These stocking programs were both brand new at the beginning of this study, and the waters were not yet open to year-round fishing at the time of stocking and for the duration of the fall. This allowed for evaluation of tagged fish independent of angling impacts, but did not allow evaluation of whether anglers targeted and caught these fish. Future work should focus on tracking the development of these fisheries, angler use, and catchability of fall yearling landlocked salmon.

RECOMMENDATIONS

- Inform anglers of this new FY LLS program and where and when to target these fish for maximum success
- Monitor angler use and development of these fisheries over time
- Make recommendations to minimize the impacts of hydropower production in Scopan Stream on the fall and winter sport fishery, and improve in-stream habitat
- Use movement data from this study to adjust stocking locations to those that will maximize retention of FY LLS in target streams
- Consider future changes to these programs, including fishing regulations, stocking rates and species stocked to maximize angler opportunity and returns of stocked fish

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COOPERATIVE

STATE FEDERAL

PROJECT

This report has been funded in part by the Federal Aid in Sport Fish Restoration Program. This is a cooperative effort involving federal and state government agencies. The program is designed to increase sport fishing and boating opportunities through the wise investment of angler's and boater's tax dollars in state sport fishery projects. This program which was founded in 1950 was named the Dingell-Johnson Act in recognition of the congressmen who spearheaded this effort. In 1984 this act was amended through the Wallop Breaux Amendment (also named for the congressional sponsors) and provided a threefold increase in Federal monies for sportfish restoration, aquatic education and motorboat access.

The program is an outstanding example of a "user pays-user benefits" or "user fee" program. In this case, anglers and boaters are the users. Briefly, anglers and boaters are responsible for payment of fishing tackle, excise taxes, motorboat fuel taxes, and import duties on tackle and boats. These monies are collected by the sport fishing industry, deposited in the Department of Treasury, and are allocated the year following collection to state fishery agencies for sport fisheries and boating access projects. Generally, each project must be evaluated and approved by the U.S. Fish and Wildlife Service (USFWS). The benefits provided by these projects to users complete the cycle between "user pays – user benefits."

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