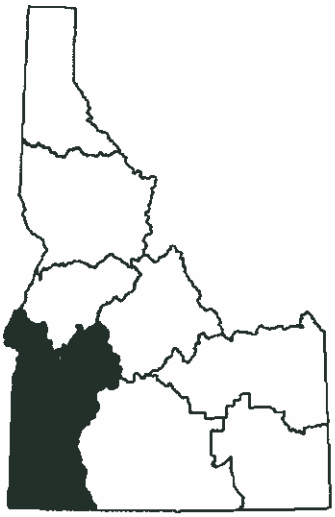
FISHERY MANAGEMENT INVESTIGATIONS

IDAHO DEPARTMENT OF FISH AND GAME

FISHERY MANAGEMENT ANNUAL REPORT

Cal Groen, Director



SOUTHWEST REGION

2008

Joseph R. Kozfkay, Regional Fish Biologist
Arthur E. Butts, Regional Fish Biologist
Lance Hebdon, Regional Fish Biologist
Jeff C. Dillon, Regional Fish Manager

January 2010
IDFG 09-130

South Fork Boise River Canyon Electrofishing Survey

ABSTRACT

The South Fork Boise River canyon section below Danskin Bridge was sampled with raft electrofishing equipment the first time during October 2008. Objectives for the survey included characterizing the size structure of the rainbow trout population for comparison to the upper tailwater section, and identifying sections that could serve as trend sites for future sampling. Eleven transects were sampled and a total of 211 rainbow trout were captured and measured. Rainbow trout between 250 - 400 mm were present in higher proportions than in the upper tailwater section, which is sampled every three years. Larger rainbow trout (>508 mm) were encountered at a higher rate in the tailwater section, but were not sampled in the canyon section. Ten of the 11 transects sampled in 2008 met criteria for serving as future sites for trend monitoring and mark-recapture studies. Future investigations will determine which sites to use and how often the surveys should occur.

INTRODUCTION

Rivers downstream from dams form some of the most valued trout fisheries in the western United States. The South Fork Boise River (SFBR) below Anderson Ranch Dam is a highly-valued trout fishery and was the first river section in Southwest Idaho to be managed under "quality trout" regulations. Regulations restrict terminal tackle to no bait and barbless hooks from Neal Bridge (Forest Road 189) upstream to Anderson Ranch Dam. Rainbow trout harvest is restricted to 2 fish, none under 20 inches (508 mm). The fishery is supported by a population of wild rainbow trout and mountain whitefish. Migratory bull trout are present at very low densities.

The SFBR between Anderson Ranch Dam to the confluence of Arrowrock Reservoir is divided into two sections: 1) the tailwater section, approximately 16 km long, runs from Anderson Ranch Dam downstream to Danskin bridge, and 2) the canyon section, approximately 27 km long, runs from Danskin Bridge downstream to Neal Bridge (Figure 49). The tailwater section has a public road and access along the entire reach and receives more angling pressure. It is also a popular destination for drift-boat fishing. The canyon section has extremely limited access by foot or road because of the high canyon walls and is accessible mostly by raft due to the Class II and III rapids in the section.

Rainbow trout populations in the tailwater section of SFBR have been monitored in a 9.6-km section every three years since 1994 using mark-recapture techniques. The section starts at the boat ramp near Reclamation Village (4.2 km downstream from the dam) and ends at the take-out 1.1 km downstream from Cow Creek Bridge (Flatter et al. 2003). In 2006, sampling methodologies for the tailwater section were changed from raft electrofishing to canoe electrofishing in order to increase sampling efficiency and obtain better population estimates. In addition, 3 sections that were approximately 1-km long were identified within the historic surveys' boundaries for sampling. Kozfkay et al. (In press) demonstrated a pronounced increase in electrofishing efficiency for all size groups of rainbow trout resulting from the shift in sampling methodologies. From 1994 to 2006, rainbow trout population trends in the tailwater section indicate decreasing abundance, an increase in size structure, and a relative lack of intermediate-size (200 - 400 mm) fish.

Because of the difficult access and whitewater conditions, there has not been a documented attempt to assess fish populations within the canyon section. In 2008, IDFG decided to implement an electrofishing survey of the canyon section to compare with wild rainbow trout size distribution for the tailrace section, and to establish trend reaches in the canyon for semi-annual monitoring.

METHODS

A raft mounted with electrofishing gear was used to collect fish and estimate size structure in the canyon section during September 19-20, 2008. Sample sites were selected on site during the downstream float. Reaches were selected when flow and habitat conditions were visibly conducive to safe navigation, electrofishing, and capturing fish for a distance $\geq$ 200 m. Beginning and ending transect coordinates were recorded for each sampling reach using a Garmin Global Positioning System (GPS). In one case, the canyon walls prohibited the GPS unit from communicating with satellites and the coordinates were estimated afterwards with topographic software. Electrofishing equipment included a raft, generator, Coffelt VVP-15, and

two booms each supporting a 76-cm ring from which eight dropper anodes were suspended, and 11 m of 0.95-cm, diameter stainless steel cable served as a cathode. VVP settings used to collect fish were 350 V and approximately 3 A, pulsed direct current. Electrofishing was conducted with a single pass from upstream to downstream. One person rowed the raft and one person attempted to capture all trout. Only trout and whitefish were placed in the livewells. In addition, two catarafts carrying overnight camping provisions and equipment followed the raft during the survey. Upon completion of a section, or when the livewell was judged to be at capacity, the crew stopped at the nearest riffle to process fish. Fish were identified and measured for total length (mm). River flow during electrofishing was approximately 51 m^3/s.

DISCUSSION AND RESULTS

A total of 11 transects were sampled between Danskin and Neal bridges during the 2-d survey. We captured 211 wild rainbow trout (Table 20) with a size range of 104 to 551 mm and a mean length of 284 mm (Figure 50). Comparison of length frequencies between the 2006 tailwater section and 2008 canyon section show a greater proportion of mid-sized rainbow trout between 200 and 450 mm in the canyon section, while proportionally more fish >450 mm existed in the tailwater section (Figure 51). The proportion of rainbow trout <250 mm were similar between the two sections, fish between 250-400 mm were captured at a higher frequency in the canyon section, while larger fish, particularly fish >508 mm were encountered at a higher rate in the tailwater section (Figure 51). Fish <100 mm were captured infrequently in the tailwater section and none were captured in the canyon section (Figure 49). However, comparing relative abundance between the two sections for rainbow trout < 100 mm is problematic because of the differences in sampling efficiencies for smaller fish between the two sampling methods. Rainbow trout <100 mm are generally found in shallow near-shore habitats with less flow which are less likely to be sampled efficiently by the raft gear. Additionally, electrofishing is size-selective for larger individuals and, without correction, often results in biased estimators of population size and size structure for smaller and slower growing individuals (Anderson 1995). Overall, raft electrofishing is less efficient for all size classes as the ability to capture fish is decreased by the limited mobility of the anodes and netter and by the inability to shock both banks. A total of 137 mountain whitefish were also captured (range = 89-547 mm; Figure 52). Mountain whitefish length distributions were similar between the two sections although a greater proportion of fish >400 mm were captured in the canyon section.

To examine potential sampling bias in rainbow trout length frequencies due to gear type, we compared both raft (2003) and canoe (2006) samples for the tailrace section to the 2008 raft sampling in the canyon. In the tailrace, both sample gears generated very similar length frequencies, with a noticeable lack of fish in the 250-400 mm size classes (Figure 52). Raft electrofishing clearly captured proportionately more 250-400 mm fish in the canyon section. We believe this is an accurate reflection of population differences for fish >100 mm between the tailrace and canyon section.

Aside from estimating size structure of rainbow trout within the canyon section, an objective of the 2008 canyon survey was to identify approximately 1-km-long sections of river that could be re-sampled in the future and perhaps be used for mark-recapture abundance estimates. A total of 11 transects were sampled, varying in length between 0.5-1.6 km (Table 20). Based on transects surveyed in 2008 nearly all sampled sections aside from transect 4 were close to containing approximate one km sections of river that were not interrupted by abrupt changes in habitat such as rapids. From this information, 3 or more transects could

easily be chosen for future sampling events. However, because of the width of the river, attempts at estimating abundance using mark-recapture techniques will likely require two rafts concurrently sampling near each bank, which may be problematic in terms of acquiring adequate equipment and personnel for two separate marking and recapture events. Furthermore, it may be beneficial to conduct the canyon survey during the same year as the tailwater section for comparison purposes. At a minimum, this effort has established baseline size structure data for wild rainbow trout which will be easily repeatable in the future.

MANAGEMENT RECOMMENDATIONS

1. Continue to monitor rainbow trout population trends in canyon section using 3-4 previously sampled transects within next 3 years.

2. Attempt mark-recapture population estimate in canyon section using two rafts concurrently for both mark and recapture events.

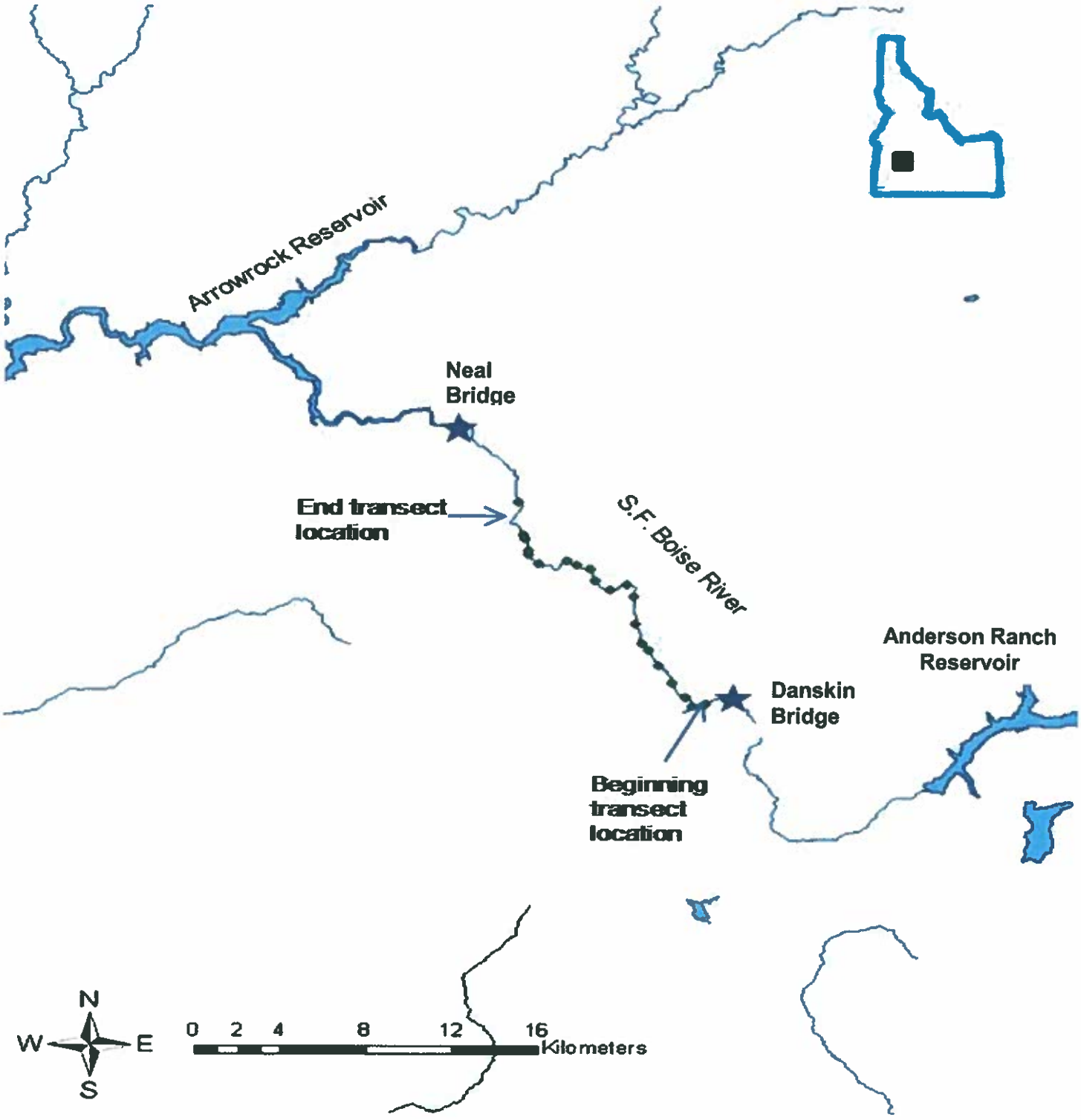


Figure 49. Map of South Fork Boise River and the starting and ending locations for all 11 transects sampled in the canyon section in 2008.

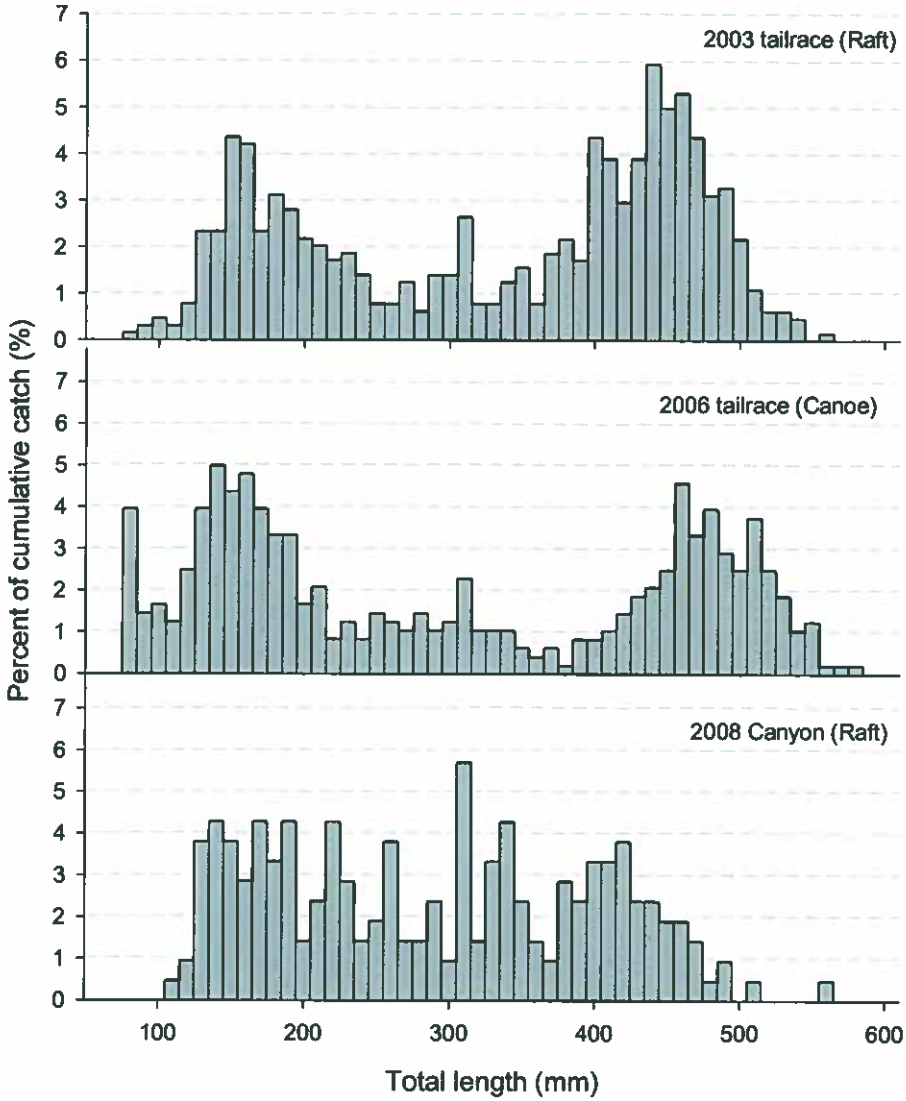


Figure 50. Rainbow trout length frequency distributions, calculated as proportion of total catch, for the 2003 and 2006 tailwater surveys and the 2008 canyon survey. The 2006 tailwater section was sampled by canoe electrofishing methods while the 2003 tailwater and 2008 canyon section was sampled by raft electrofishing.

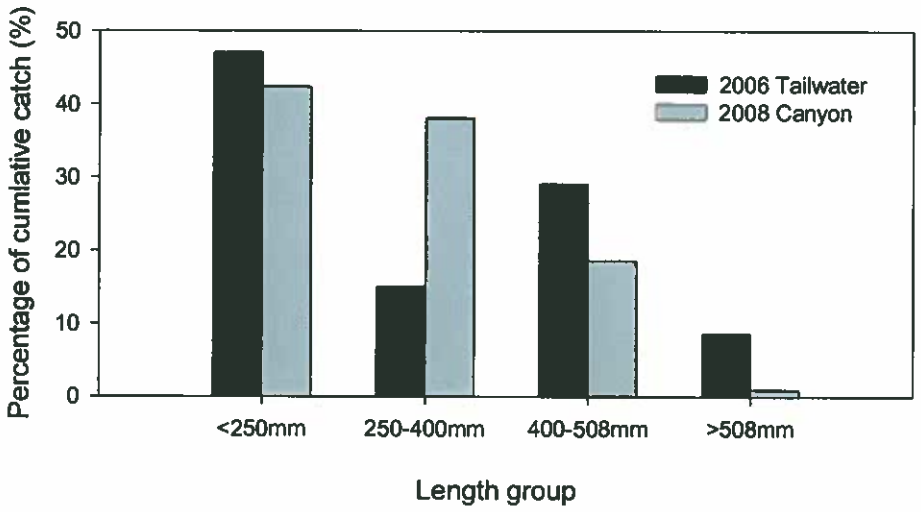


Figure 51. Comparison of proportion of rainbow trout captured by length groups between the 2006 tailwater survey and the 2008 canyon survey.

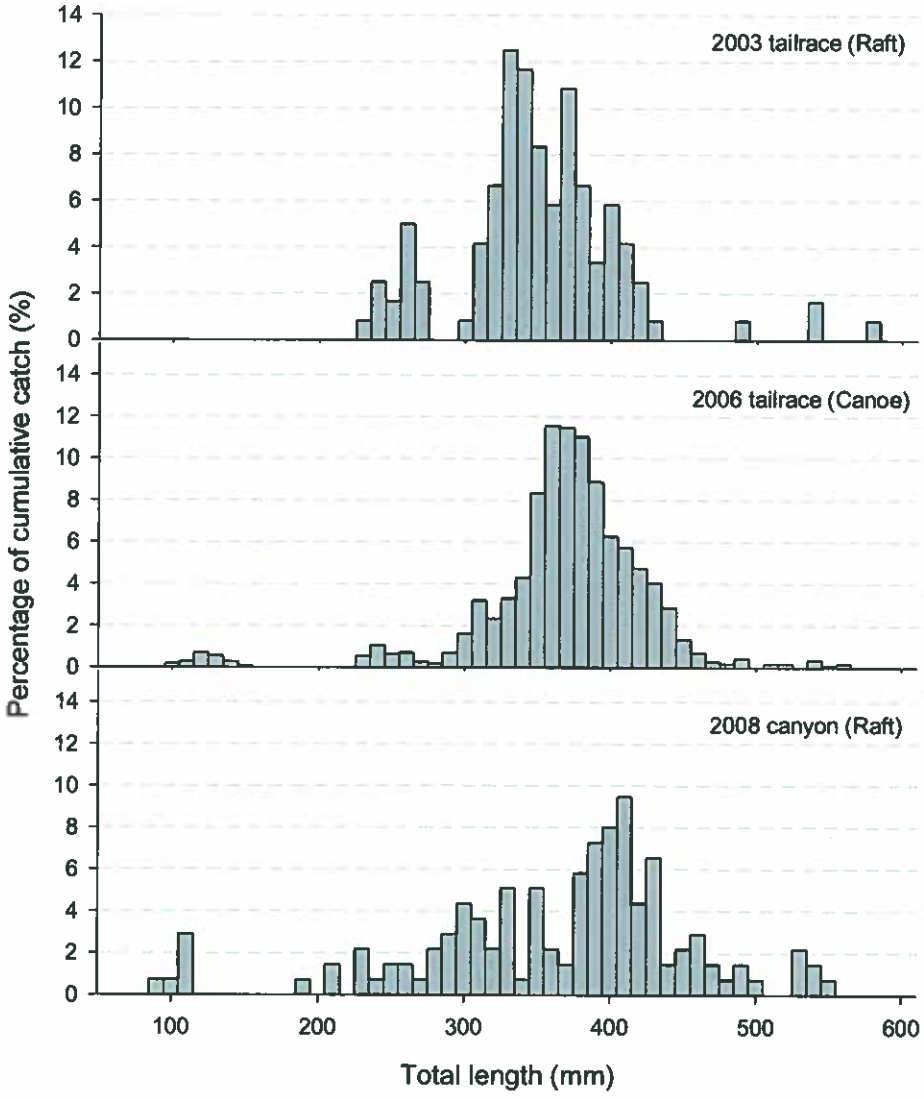


Figure 52. Mountain whitefish length frequency distributions, calculated as proportion of total catch, for the 2003 and 2006 tailwater surveys and the 2008 canyon survey. The 2006 tailwater section was sampled by canoe electrofishing equipment while the 2003 tailwater and 2008 canyon section was sampled with raft electrofishing equipment.

Table 20. Transect lengths and number of rainbow trout and mountain whitefish captured in each transect and for the entire survey. Transect lengths were estimated from start and end GPS coordinates and transect site descriptions.

Sites	Transect length (km)	Mountain whitefish	Rainbow trout	Total
Transect 1	0.7	22	3	25
Transect 2	0.7	11	23	34
Transect 3	1.3	20	9	29
Transect 4	0.5	21	19	40
Transect 5	1.6	18	28	46
Transect 6	0.9	29	16	45
Transect 7	0.8	15	35	50
Transect 8	0.5		8	8
Transect 9	0.7		14	14
Transect 10	1.0		30	30
Transect 11	1.3	1	26	27
Total	10.0	137	211	348