South Branch Galien River 2011 Survey Report

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Introduction

The South Branch Galien River (hereafter referred to as the South Branch) is formed by fusion of the Galena River and Spring Creek approximately 0.2 miles north of the Michigan-Indiana boundary (Figure 1). The Galena River arises in wetlands near Springville, Indiana and flows for about 8.5 miles to the confluence with Spring Creek. Spring Creek begins near I-90 in northern Indiana and flows for approximately 15 miles to the confluence with the Galena River. From this point, the South Branch Galien River flows northward for 6 miles to its confluence with the Galien River. The average gradient in the South Branch is approximately 4 ft/mile. There are no dams on the South Branch or Spring Creek. The entire length of the South Branch and numerous miles of tributary streams are accessible to fish moving upstream from Lake Michigan.

A wide variety of soil types exist within the Spring Creek and Galena River sub-watersheds, ranging from muck to well-drained sandy loams. The predominant soils surrounding the South Branch are silty loams of the Blount-Pewamo-Glynwood series (State Soil Geographic Database 1994). These soils are somewhat poorly drained, and Darcy maps indicate low potential for groundwater inflow throughout most of the river system. Portions of the watershed have been affected by dredging and channelization. In some areas, dredging and draining of wetlands has increased groundwater movement into the South Branch or tributary streams. Agriculture and forests are the primary land uses in the watershed. Forested riparian buffer strips are common along the South Branch, Spring Creek, and the Galena River, but are scarce along some tributary streams.

The first fisheries survey on the South Branch was completed in 1976. Eight fish species were collected in 300 ft of electrofishing effort near Kruger Road. The only game fish captured were small bluegills, pumpkinseeds, and green sunfish. In 1987, sampling was conducted at three sites: Kruger Road, US-12, and Forest Lawn Road. Rotenone (a natural fish toxicant) was applied at each site. Block nets were set to collect dead fish and potassium permanganate was used to detoxify the rotenone at the downstream end of each station. Station lengths varied from 500 ft at US-12 to 804 ft at Forest Lawn Road. Overall, 29 fish species were collected during the survey. The species diversity at each site ranged from 16 species at US-12 to 26 species at Kruger Road. Game fish species observed during the 1987 survey included Chinook salmon, steelhead, bluegill, pumpkinseed, green sunfish, walleye, largemouth bass, northern pike, and channel catfish.

A brown trout stocking program was initiated on the South Branch in 1988 (Table 1). Yearling brown trout were stocked annually at Kruger Road, US-12, and Forest Lawn Road. Electrofishing surveys were conducted at Forest Lawn Road and US-12 during August 1992. Ten brown trout (total length = 6-9 inches) were captured during these surveys. Electrofishing also was conducted on the Galena River at T1000 N, but no brown trout were collected.

Electrofishing surveys were conducted at Forest Lawn Road and US-12 in July 1999. Only three brown trout (total length = 7 inches) were captured at Forest Lawn Road and zero brown trout were collected at US-12. After this survey, the two downstream stocking sites were eliminated. Since 2000, yearling brown

trout have been stocked annually at the Forest Lawn Road crossing on the South Branch and the Martin Road crossing on Spring Creek.

The South Branch is classified as a Type 4 trout stream with a 10 inch minimum size limit for brown trout. The South Branch is open for fishing all year, but the brown trout possession season is limited to the last Saturday in April through September 30. Spring Creek is a Type 1 trout stream with an 8 inch minimum size limit for brown trout. Spring Creek is open to fishing from the last Saturday in April through September 30.

Temperature loggers have been deployed in the South Branch periodically since 2000. The mean July water temperatures at Kruger Road were 70.2 ^{o}F in 2005 and 69.6 ^{o}F in 2006. At Forest Lawn Road, the mean July water temperatures were 65.6 ^{o}F in 2000 and 69.7 ^{o}F in 2010.

In 2001, the Berrien County Drain Commission received a nonpoint source pollution grant under the United States Environmental Protection Agency's Clean Water Act Section 319. This grant funded the development of the Galien River Watershed Management Plan (Fishbeck, Thompson, Carr, and Huber, Inc. 2003). At the beginning of the watershed plan development, a steering committee was assembled that included representatives of numerous federal, state, local, and tribal agencies, non-governmental organizations, consulting firms, and riparian landowners. This group has begun addressing some of the habitat issues within the watershed, but it will take many years to accomplish all of the objectives listed in the management plan.

Materials and Methods

An electrofishing survey was conducted to evaluate survival and growth of stocked brown trout. A stream shocker (250 V DC, 2 probes) was used to capture fish in the South Branch on September 20, 2011. With the existing flow conditions, large stretches of the South Branch were too deep to efficiently sample with a stream shocker. Due to these conditions, sampling was limited to a short station downstream of the Forest Lawn Road crossing. The station began where the South Branch flows adjacent to Forest Lawn Road and extended 400 ft upstream. A single electrofishing run was completed while moving in an upstream direction. Total length was recorded for all brown trout captured. Scale samples also were collected from brown trout for age determination. The presence of other fish species was documented, but these fish were not measured or counted.

Results

Eleven brown trout were captured during this sampling effort. The total length range for these fish was 3-16 inches (Figure 2). Forty-five percent of the brown trout were of legal size. Scale samples indicated that at least four age classes (0-3) were represented in the catch, but the scales collected from the 11-16 inch brown trout were not suitable for age determination. Only one young-of-year trout was captured. Mean lengths-at-age were average for Michigan brown trout populations (Figure 3). However, about half of the brown trout collected were emaciated. Thirteen additional fish species were observed during the survey (Table 2).

Analysis and Discussion

Based on mean July water temperatures, the South Branch would be classified as a warm transitional stream (Zorn et al. 2008). The species composition of the fish community supports this classification. Brown trout are present, but warmwater and transitional fish species are common (Table 2).

Multiple factors are limiting brown trout production in the South Branch. (1) Summer water temperatures are marginal for trout survival. Brown trout abundance typically is greatest in streams with mean July water temperatures < 68 ^{o}F. During most years, the mean July water temperature in the South Branch exceeds this threshold. (2) The South Branch is highly turbid, especially after snowmelt or rain events. High turbidity affects trout in a variety of ways. Kerr (1995) summarized the physiological effects of high turbidity on fish.

> In most cases, elevated suspended sediments have sublethal effects. These may include fin rot and body abrasion (Herbert and Merkens 1961; Ritchie 1972), paler coloration (McLeay et al. 1984), delayed maturation (Reynolds et al. 1988), elevated cough frequency (Servizi and Martens 1992), elevated microhematocrit (packed red blood cell volume), hemoglobin concentration and red blood cell counts (Appleby and Scarratt 1989; Redding et al. 1987) and decreased tolerance rates and time to death when exposed to other environmental stressors (Appleby and Scarratt 1989; McLeay et al. 1984; Redding et al. 1987). [From Kerr 1995]

Turbidity also reduces trout foraging efficiency (Stuart-Smith et al. 2004). Trout are visual predators, and high turbidity decreases the reactive distance for detecting and capturing prey items (Barrett et al. 1992). (3) The South Branch has a large bedload of sand that constantly is shifting. Any trout eggs deposited on this substrate would be covered with sand and deprived of oxygen. (4) Because habitat complexity is lower, the diversity and abundance of macroinvertebrates typically is much lower in areas with sandy substrates as compared to areas with gravel or cobble substrates. Thus, forage for trout is scarce in the South Branch. The poor condition of the brown trout captured during the 2011 survey supports this hypothesis.

The South Branch is a marginal trout stream. Although catch rates are never expected to be particularly high in this system, it is strategically located. The South Branch and Spring Creek are the first Michigan trout streams encountered by anglers coming from the Chicago area. The South Branch is only about an hour drive from the eastern Chicago suburbs. The next trout streams (e.g., Brandywine Creek or Pipestone Creek) are approximately 30 minutes farther into Michigan.

Management Recommendations

Two management goals have been developed for the South Branch. Goal 1: Reduce sediment inputs to the stream. Goal 2: Maintain a brown trout fishery while reducing intra-specific competition for forage and cover.

Due to the gradient and the surficial geology of the area, gravel and cobble substrates always will be limited in the South Branch. However, human activities have greatly increased the sand bedload in this stream. Fisheries Division will work with the Michigan Department of Environmental Quality and other partners to identify erosion and sedimentation sites within the watershed. Once these sites are identified, Fisheries Division personnel will meet with riparian landowners to discuss options for reducing erosion

and sedimentation and will assist landowners in securing funding to implement best management practices.

Forage is scarce in the South Branch, and it appears that the current stocking density is too high for this system. Beginning in 2013, the number of yearling brown trout stocked annually at Forest Lawn Road will be reduced from 1,200 fish to 700 fish. Because the stocking program is being adjusted to match the carrying capacity of the stream, this change in stocking practices is expected to maintain the existing fishery without a noticeable decrease in catch rates. By reducing competition for forage and resting areas, the revised stocking program may result in improved growth and condition for brown trout in the South Branch.

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Table 1.–Brown trout stocking in the South Branch Galien River (South Branch) and Spring Creek, 1988-2011. All fish were stocked as yearlings.

Year	Stream	Site	Strain	Number	Average length (inches)
1988	South Branch	Kruger Road	Plymouth Rock	850	5.36
	South Branch	US-12	Plymouth Rock	1,050	5.36
	South Branch	Forest Lawn Road	Plymouth Rock	1,250	5.36
1989	South Branch	Kruger Road	Plymouth Rock	800	6.32
	South Branch	US-12	Plymouth Rock	1,000	6.32
	South Branch	Forest Lawn Road	Plymouth Rock	1,200	6.32
1990	South Branch	Kruger Road	Soda Lake	800	5.32
	South Branch	US-12	Soda Lake	999	5.32
	South Branch	Forest Lawn Road	Soda Lake	1,198	5.32
1991	South Branch	Kruger Road	Plymouth Rock	794	5.92
	South Branch	US-12	Plymouth Rock	996	5.92
	South Branch	Forest Lawn Road	Plymouth Rock	1,200	5.92
1992	South Branch	Kruger Road	Plymouth Rock	790	6.08
	South Branch	US-12	Plymouth Rock	990	6.08
	South Branch	Forest Lawn Road	Plymouth Rock	1,188	6.08
1993	South Branch	Kruger Road	Wild Rose	800	8.32
	South Branch	US-12	Wild Rose	1,000	8.32
	South Branch	Forest Lawn Road	Wild Rose	1,200	8.32
1994	South Branch	Kruger Road	Saint Croix	870	6.80
	South Branch	US-12	Saint Croix	1,070	6.80
	South Branch	Forest Lawn Road	Saint Croix	1,270	6.80
1995	South Branch	Kruger Road	Seeforellen	745	6.12
	South Branch	US-12	Seeforellen	963	6.12
	South Branch	Forest Lawn Road	Seeforellen	1,161	6.12
1996	South Branch	Kruger Road	Seeforellen	780	6.16
	South Branch	US-12	Seeforellen	980	6.16
	South Branch	Forest Lawn Road	Seeforellen	1,180	6.16
1997	South Branch	Kruger Road	Seeforellen	926	6.12
	South Branch	US-12	Seeforellen	1,118	6.12
	South Branch	Forest Lawn Road	Seeforellen	1,328	6.12
1998	South Branch	Kruger Road	Seeforellen	790	5.40
	South Branch	US-12	Seeforellen	990	5.40
	South Branch	Forest Lawn Road	Seeforellen	1,190	5.40
1999	South Branch	Kruger Road	Seeforellen	800	5.92
	South Branch	US-12	Seeforellen	1,000	5.92

Table 1.–Continued.

Year	Stream	Site	Strain	Number	Average length (inches)
1999	South Branch	Forest Lawn Road	Seeforellen	1,200	5.92
2000	South Branch	Forest Lawn Road	Seeforellen	1,390	5.04
	Spring Creek	Martin Road	Seeforellen	1,390	5.04
2001	South Branch	Forest Lawn Road	Seeforellen	1,230	5.28
	Spring Creek	Martin Road	Seeforellen	1,230	5.28
2002	South Branch	Forest Lawn Road	Gilchrist Creek	1,210	4.92
	Spring Creek	Martin Road	Gilchrist Creek	1,210	4.92
2003	South Branch	Forest Lawn Road	Gilchrist Creek	1,200	5.14
	Spring Creek	Martin Road	Gilchrist Creek	1,200	5.14
2004	South Branch	Forest Lawn Road	Seeforellen	1,200	5.60
	Spring Creek	Martin Road	Seeforellen	1,200	5.60
2005	South Branch	Forest Lawn Road	Seeforellen	1,200	5.68
	Spring Creek	Martin Road	Seeforellen	1,200	5.68
2006	South Branch	Forest Lawn Road	Seeforellen	1,300	5.57
	Spring Creek	Martin Road	Seeforellen	1,300	5.57
2007	South Branch	Forest Lawn Road	Wild Rose	783	6.66
	Spring Creek	Martin Road	Wild Rose	783	6.66
2008	South Branch	Forest Lawn Road	Gilchrist Creek	1,200	4.16
	Spring Creek	Martin Road	Gilchrist Creek	1,200	4.16
2009	South Branch	Forest Lawn Road	Gilchrist Creek	1,400	4.47
	Spring Creek	Martin Road	Gilchrist Creek	1,400	4.47
2010	South Branch	Forest Lawn Road	Gilchrist Creek	1,300	4.86
	Spring Creek	Martin Road	Gilchrist Creek	1,300	4.86
2011	South Branch	Forest Lawn Road	Gilchrist Creek	1,080	4.82
	Spring Creek	Martin Road	Gilchrist Creek	1,080	4.82

Table 2.–Fish species observed at the Forest Lawn Road sampling station on the South Branch Galien River on September 20, 2011. Thermal classifications from Lyons et al. (2009).

Species	Thermal Classification
Bluegill	Warmwater
Brown trout	Coldwater
Blackside darter	Warmwater
Creek chub	Transitional
White sucker	Transitional
Grass pickerel	Warmwater
Green sunfish	Warmwater
Johnny darter	Transitional
Largemouth bass	Warmwater
Pumpkinseed	Warmwater
Rainbow darter	Warmwater
Rock bass	Warmwater
Stonecat	Warmwater
Yellow bullhead	Warmwater

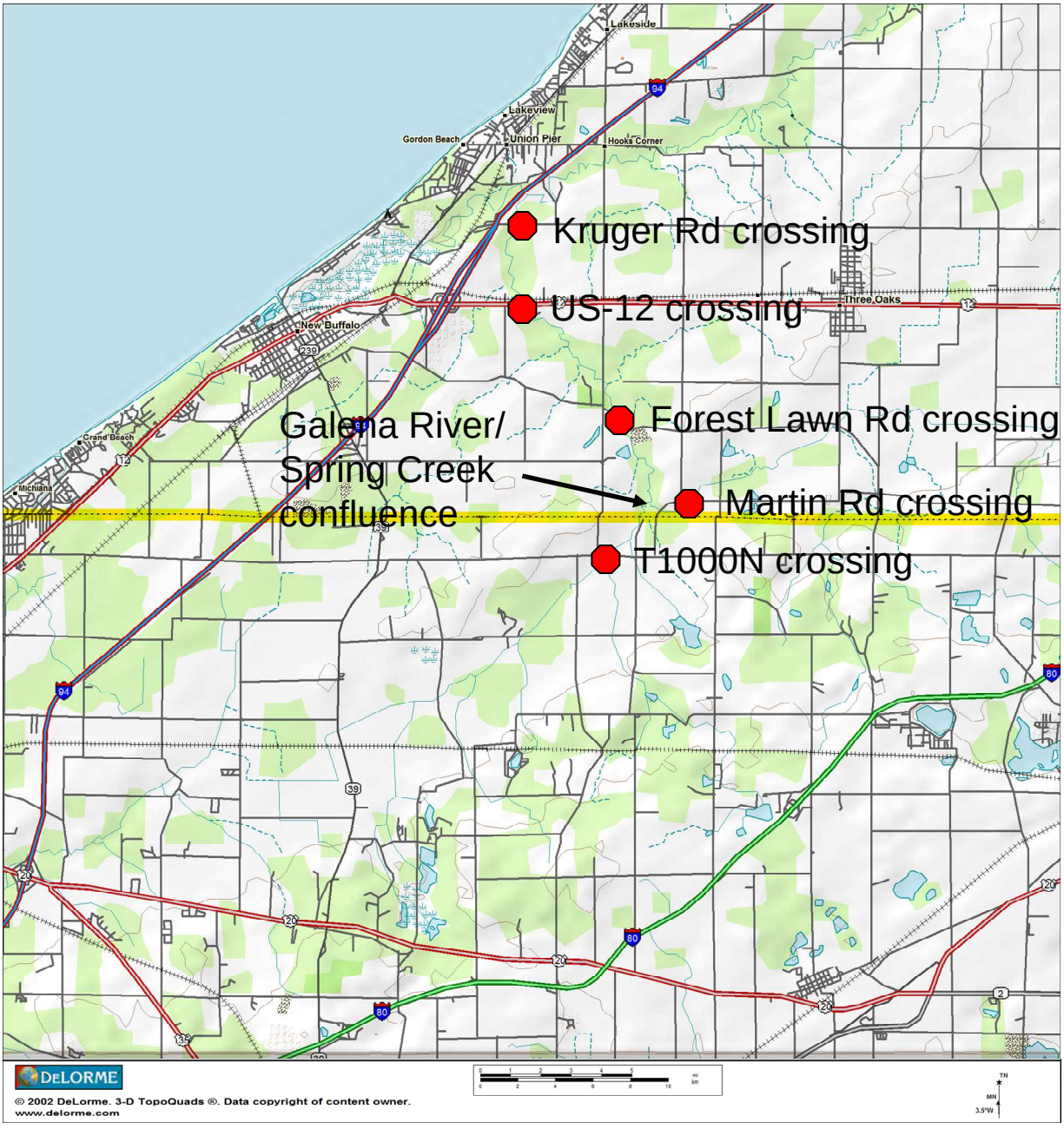

Figure 1.–South Branch Galien River, Berrien County (Michigan) and La Porte County (Indiana). Image from DeLorme 3-D TopoQuads® 3.0.

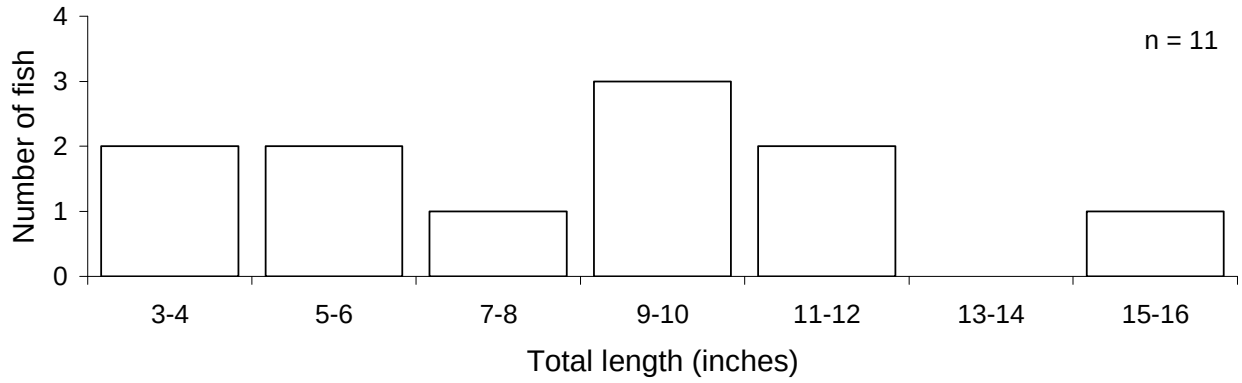

Figure 2.–Length frequency distribution for brown trout captured at the Forest Lawn Road sampling station on the South Branch Galien River on September 20, 2011.

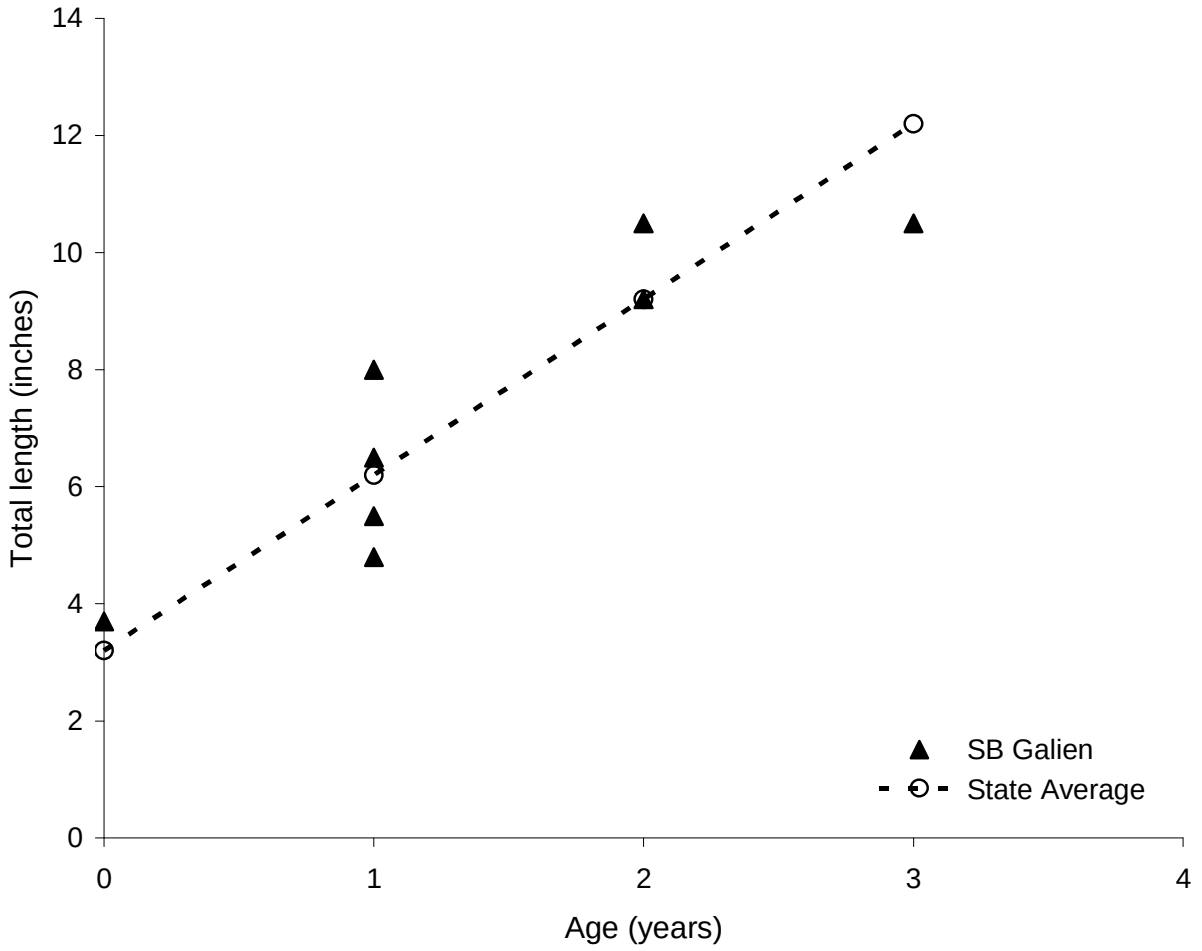

Figure 3.–Growth of brown trout in the South Branch Galien River, as determined from scale samples collected on September 20, 2011. State average lengths for August-September are from Schneider et al. (2000).