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3877

SEP 25 2001

Mr. James A. Saric, Remedial Project Manager  
United States Environmental Protection Agency  
Region V-SRF-5J  
77 West Jackson Boulevard  
Chicago, Illinois 60604-3590

DOE-0900-01

Mr. Tom Schneider, Project Manager  
Ohio Environmental Protection Agency  
401 East 5<sup>th</sup> Street  
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

**TRANSMITTAL OF THE 2001 FERNALD SITE CRAYFISH SURVEY AT PADDYS RUN**

Enclosed for your review is the August 29, 2001 Fernald Site Crayfish Survey at Paddys Run by the Ohio State University. This effort is required every three years, pursuant to the Integrated Environmental Monitoring Plan. The survey was conducted one year early due to remediation activities in 2001 adjacent to Paddys Run. The survey assesses the population of the state-threatened Sloan's crayfish (*Orconectes sloanii*) in the upstream on-property reach of Paddys Run.

The relative abundance of the Sloan's crayfish is compared against *Orconectes rusticus*, the only other species of crayfish residing on-site. Data reveal that the Sloan's crayfish is still found in large numbers within Paddys Run.

If you have any questions or need further information, please contact Pete Yerace at (513) 648-3161.

Sincerely,

Johnny W. Reising  
Fernald Remedial Action  
Project Manager

FEMP:Yerace

Enclosure: As Stated

SEP 25 2001

Mr. James A. Saric  
Mr. Tom Schneider

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DOE-0900-01

cc w/enclosure:

R. J. Janke, OH/FEMP  
D. Pfister, OH/FEMP  
P. Yerace, OH/FEMP  
T. Schneider, OEPA-Dayton (three copies of enclosure)  
G. Jablonowski, USEPA-V, SRF-5J  
J. Homer, Fluor Fernald, Inc./MS65-2  
H. Swiger, Fluor Fernald, Inc./MS65-2  
E. Woods, Fluor Fernald, Inc./MS65-2  
AR Coordinator, Fluor Fernald, Inc./MS78

cc w/o enclosure:

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A. Tanner, OH/FEMP  
F. Bell, ATSDR  
D. Carr, Fluor Fernald, Inc./MS2  
J.D. Chiou, Fluor Fernald, Inc./MS52-0  
T. Hagen, Fluor Fernald, Inc./MS65-2  
L. Ludwick, Fluor Fernald, Inc./MS65-2  
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FERNALD SITE CRAYFISH SURVEY AT PADDYS RUN  
AUGUST 29, 2001

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### Introduction

On Wednesday, August 29, 2001, a survey of the crayfish populations of a portion of Paddys Run located within the boundaries of the Fernald site was conducted. The crayfish species *Orconectes sloanii*, a threatened species in Ohio, was found in this stream during an initial investigation in 1993 and was still present in abundance at both the September 1996 and June 1999 surveys (Table 3). This most recent survey was conducted to determine if *O. sloanii* was still present and to compare its relative abundance with *Orconectes rusticus* (the only other crayfish species found in Paddys Run).

### Methodology

Collecting was done with a common minnow seine. The specimens were identified by the author and data recorded indicating species, sex, male form I (breeding) or male form II (non-breeding), adult or juvenile (Table 1). Following data collection, the specimens were returned live to Paddys Run. Ten collecting sites were utilized: four north (upstream) of the train trestle, one at the train trestle and five south (downstream) of the train trestle (Figure 1). The numbers and locations of the collecting sites in the Tables correspond to those used in the June 1999 survey. Fourteen sites were collected in 1996, but this was reduced to ten in 1999. The site numbers used in 1996 were correlated with those used in 1999 and 2001 (Table 3). Site nine was not collected during the 1999 survey because of low water levels.

### Results and Discussion

Sampling at the 10 collection sites yielded 764 specimens. Table 1 shows the specific species and form breakdown for each site. More species were collected in 2001 than in 1996 and 1999 combined (Table 2). The four-fold increase in species from 1999 to 2001 is probably due to several factors. First, water levels were much lower in 1999. Second, there were no large mats of algae (*Spirogyra sp.*) which were present in 1999 and provided cover for the crayfish and made seining difficult. The absence of the algal growth may be the result of the removal of the cattle from the creek and, therefore, a reduction in the organic matter entering Paddys Run. The small number of juveniles collected (12) was the result of collecting in August instead of June as was done in 1999. Those species of the genus *Orconectes* whose life histories have been studied usually breed in late March and early April. The females carry the fertile eggs on their swimmerets until the young hatch and are free swimming. The paucity of juveniles in late summer is, therefore, not an indication of a diminishing population.

The percentage of *O. sloanii* to *O. rusticus* continues to decline. In 2001, *O. sloanii* represented roughly 44% of the species collected (Table 3). In 1999, 66% of the species surveyed were *O. sloanii*, while in 1996, *O. sloanii* accounted for 75% of the species collected (Table 3).

The number of *O. sloanii* specimens identified in this survey is encouraging, nevertheless, the data indicate a continued decline in the percent of the *O. sloanii* population as compared with the *O. rusticus* population (Figure 2). As stated in the 1999 report, it is the observation of the author and other crayfish workers that in most localities where *O. rusticus* competes with other crayfish species, *O. rusticus* is usually more successful over time. One factor that seems favorable to *O. rusticus*, or deleterious to *O. sloanii* or both is the poor condition of some streams, with the urbanization and industrialization of the surrounding area and stream pollution (up to a point) favoring *O. rusticus*. Paddys Run, however, appears to not be suffering from any of these problems. Figure 3 illustrates that declines in the *O. sloanii* population are occurring both upstream and downstream of the confluence with the north drainage ditch (at the train trestle). This is the most upstream FEMP discharge point into Paddys Run. In other localities, the success of *O. rusticus* and the decline of an indigenous species appear to be a function of the larger size and more aggressive behavior of *O. rusticus*. If this is the case, then the decline of *O. sloanii* in Paddys Run may be unavoidable, regardless of the condition of the stream and any remediation applied to it.

**TABLE 1  
CRAYFISH COLLECTED BY SITE**

Collecting Site	<i>Orconectes sloanii</i>					<i>Orconectes rusticus</i>				
	Males: I <sup>a</sup>	Males: II <sup>b</sup>	Females	Juveniles	Total	Males: I <sup>a</sup>	Males: II <sup>b</sup>	Females	Juveniles	Total
<b>Downstream of Train Trestle</b>										
10	0	1	5	1	7	1	3	4	0	8
9	1	5	8	0	14	14	11	19	1	45
8	2	7	8	0	17	3	1	2	0	6
7	10	54	56	1	121	32	26	45	1	104
6	3	8	14	0	25	7	4	8	0	19
<b>Train Trestle</b>										
5	0	2	3	0	5	8	7	18	0	33
<b>Upstream of Train Trestle</b>										
4	1	2	1	0	4	7	6	9	0	22
3	2	32	42	0	76	28	25	60	1	114
2	0	10	11	5	26	6	6	16	1	29
1	1	23	16	1	41	8	14	27	0	49
<b>Totals</b>	<b>20</b>	<b>144</b>	<b>164</b>	<b>8</b>	<b>336</b>	<b>114</b>	<b>103</b>	<b>208</b>	<b>4</b>	<b>428</b>

<sup>a</sup> breeding form males

<sup>b</sup> non-breeding form males

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TABLE 2  
COMPARISON OF CRAYFISH COLLECTED BY SITE  
1996, 1999, 2001

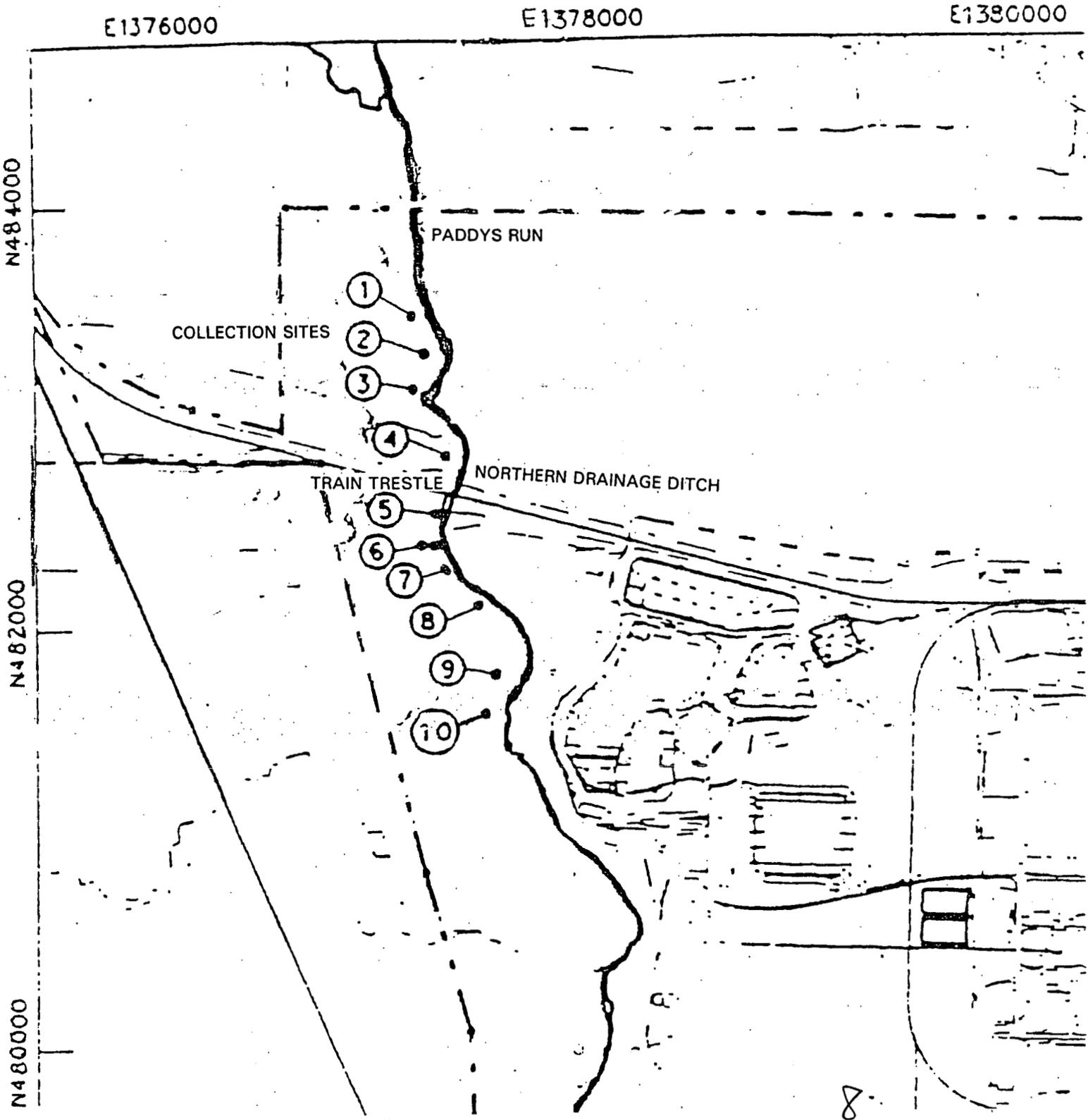
Collecting Site	<i>Orconectes sloanii</i>			<i>Orconectes rusticus</i>		
	1996	1999	2001	1996	1999	2001
Downstream of Train Trestle						
10	13	22	7	9	10	8
9			14			45
8	19	5	17	5	2	6
7	29	39	121	6	14	104
6	9	6	25	2	8	19
Train Trestle						
5	13	0	5	0	2	33
Upstream of Train Trestle						
4	18	36	4	4	21	22
3	8	7	3	2	0	114
2	9	2	2	1	0	28
1	41	0	1	17	4	49
<b>Totals</b>	<b>227</b>	<b>117</b>	<b>336</b>	<b>75</b>	<b>61</b>	<b>428</b>

TABLE 3  
 PERCENTAGE OF SPECIES COLLECTED BY SITE  
 1996, 1999, 2001

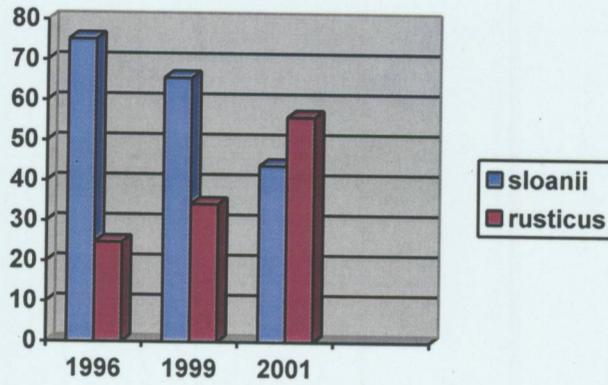
Collecting Site	<i>Orconectes sloanii</i>			<i>Orconectes rusticus</i>		
	1996	1999	2001	1996	1999	2001
Downstream of Train Trestle						
10	59.1	68.8	46.7	40.9	31.2	53.3
9			23.7			76.3
8	79.2	71.4	73.9	20.8	28.6	26.1
7	82.9	73.5	53.8	17.1	26.4	46.2
6	81.8	42.9	56.8	18.2	57.1	43.2
Train Trestle						
5	100	0.0	13.2	0.0	100.0	86.8
Upstream of Train Trestle						
4	81.8	63.2	15.4	18.2	36.8	84.6
3	80.0	100.0	40.0	20.0	0.0	60.0
2	90.0	100.0	48.1	10.0	0.0	51.9
1	71.0	0.0	45.6	29.0	100.0	54.4
<b>Totals</b>	<b>75.2</b>	<b>65.7</b>	<b>44.0</b>	<b>24.8</b>	<b>34.3</b>	<b>56.0</b>

Figure 1

Map of Collection Area

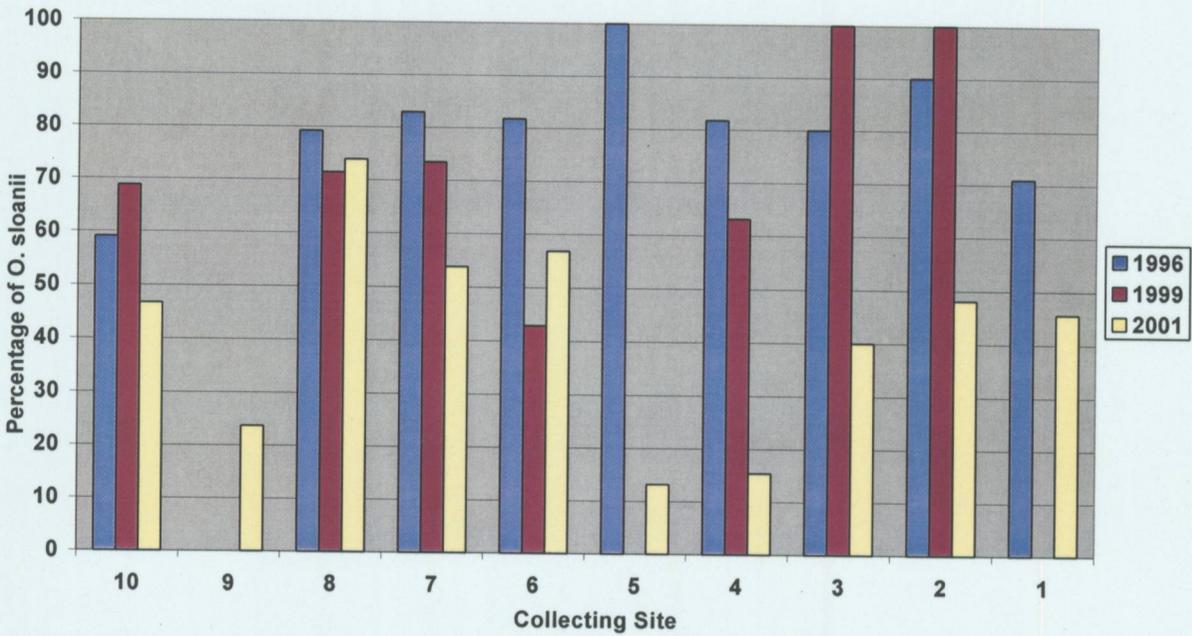


**Figure 2**  
**Changes in the populations of *O. sloanii* and *O. rusticus***



Total number of specimens: 1996 = 302, 1999 = 178, 2001 = 764

**Figure 3**  
**Changes in the population of *O. sloanii* from 1996-2001**



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