



July 1, 2004

To: Mr. Thomas L. Pate, PE Supervising Water Resources Engineer Solano County Water Agency 508 Elmira Road Vacaville, CA 95687 Mr. Richard Marovich Putah Streamkeeper c/o Solano County Water Agency 508 Elmira Road Vacaville, CA 95687

RE: Putah Creek NZMS Monitoring Project

Background:

The New Zealand Mud Snail is a highly invasive, aquatic mollusk, that can, in some habitats severely alter the lower aquatic food web. Algal grazing by NZMS may decrease food availability and in some habitats physically displace native invertebrates. Fish species that forage on native invertebrates might be affected if NZMS populations reach 25,000 / m².

In October 2003, New Zealand Mudsnails were discovered at Fishing Access # 3 on the Yolo County side of Putah Creek. An emergency delineation funded by the U.S. Bureau of Reclamation determined that the NZMS infestation was approximately one mile in length.

The NZMS situation was complicated in February 2004, when storm events caused the overflow of the Lake Berryessa Glory Hole sending a surge of 12,000 CFS down the Putah Creek drainage. That surge extended the range of the known NZMS infestation to approximately 9.67 kilometers (6 miles) in length (see map).

The NZMS infestation complicates several management and environmental factors in the Putah Creek drainage:

- 1. The unknown impact of NZMS infestation on water conveyance infrastructure.
- 2. The unknown impacts to drinking water systems and agricultural water supply.
- 3. The impacts to a highly productive and popular recreational trout fishing area.
- 4. Impacts to a newly restored salmonid spawning area below the Solano Diversion Dam.

Current NZMS Population Delineation:

As of July 1, 2004, we have not found any NZMS below (downstream) of the Ruggles Property (N38°30"8.5'; W121°59 '22.9"). Surveys at access sites below the Ruggles property have included "D" net sampling, basket colonization, and intense visual surveys. The Ruggles site is approximately 2.90 kilometers upstream from the Winters bridge.

NZMS Population Density:

It is important to establish a baseline population density of the New Zealand Mudsnail population in Putah Creek to allow the measurement of impacts on native invertebrates. Measurements will be recorded at several locations in the interdam reach and in Lower Putah Creek. High water levels and velocities have until recently prevented the effective measurement of NZMS populations. Recent development of a 32.5cm² subsurface frame that can be used with a standard "D" net facilitates the measurement of developing NZMS populations in areas to deep or swift for a Surber net.

Interdam Reach. Site JA: Note that this site is approximately 0.5 Kilometer below Fishing Access #3. During the December 2003 Emergency Delineation, NZMS were <u>rare</u> at this site. Although no formal population density was recorded in December 2003, we only found three (3) NZMS at the site. Currently, NZMS at this site are visible on the surface of the rocks. Water depth and velocity were also recorded. Partial data in the table below.

Putah Creek - Riffles at Site JA - 6/28/04		
Site Sample	Collection #	NZMS (#/m²)
1	893-22JA	1145
2	894-22JA	4450
3	895-22JA	1005
4	896-22JA	2992
5	897-22JA	691
6	898-22JA	1316
7	899-22JA	1240
8	900-22JA	3995



Putah Creek, riffles at Site JA

Movement of NZMS:

My concerns about the movement of NZMS in the invertebrate drift (normal daily movement of non-mollusk invertebrates in the water column) were heightened by two six-hour invertebrate



NZMS measuring approximately 0.5mm long move on a strand of floating algae.

drift samples taken at the site shown above. All samples contained NZMS that were ≤1mm in length. Half of the NZMS were approximately equal to .5mm length (see image on left).

Putah South Canal:

On June 31, 2004, I "spot sampled" several highly susceptible sites in or connected to the Putah South Canal, including Terminal Reservoir (2 sites), Green Valley Creek, Waterman Treatment Site, Sweany Creek, and the Putah Diversion Dam. Results: All sites were NEGATIVE for NZMS. Note: The sample taken at the Diversion Dam consisted of five samples of plant material removed from the algae screens. No NZMS were found in the composite sample. I want to rethink the validity of using the algae screen samples for NZMS determinations. Reason: No New Zealand Mud Snails were found in the sample, yet neither were any of the common invertebrates that I find in plant material collected in Lake Solano. If the composite contained a reasonable sample of the invertebrate community found in the lake and no NZMS then I would consider the sample valid.

Recommended actions for NZMS:

- 1. Interdam Reach: Work will continue to determine the NZMS population density.
- 2. Diversion Dam:

Current Situation: Although NZMS have been found upstream and downstream of the Putah South Canal, NO NZMS have been found in the immediate vicinity of the intake for the Putah South Canal.

Action Planned (funded): Sampling traps will be set up in the lake at several sites to monitor the NZMS in the vicinity of the canal intake.

3. Putah South Canal:

Current Situation: Spot checks have not found any NZMS at selected sites in the canal, conveyance creeks, or the Terminal Reservoir. **Recommended Action:**

1. Develop a comprehensive plan to monitor selected sites in the Putah South Canal and sensitive conveyances such as Sweany Creek. I will forward my recommendations by July 15, 2004.

4. Lower Putah Creek:

Current Situation: Intensive surveys have found NZMS downstream only as far as the Ruggles Property which is 1.7 kilometers downstream from the Diversion Dam.

Action Planned (funded):

- 1. Downstream surveys will continue to track the movement of NZMS.
- 2. Downstream surveys will determine the NZMS density at selected riffles using accepted protocols.
- 3. Downstream surveys will determine the movement of NZMS via the invertebrate drift.

Report Submitted 7/4/04

Ken W. Davis Attachments: Map of 2004 NZMS population Sample Inventory Report Sample Biomonitoring Manual Page