ProBiota, FCNyM, UNLP
ISSN 1515-9329

Serie Técnica y Didáctica nº 21(46)

Semblanzas Ictiológicas
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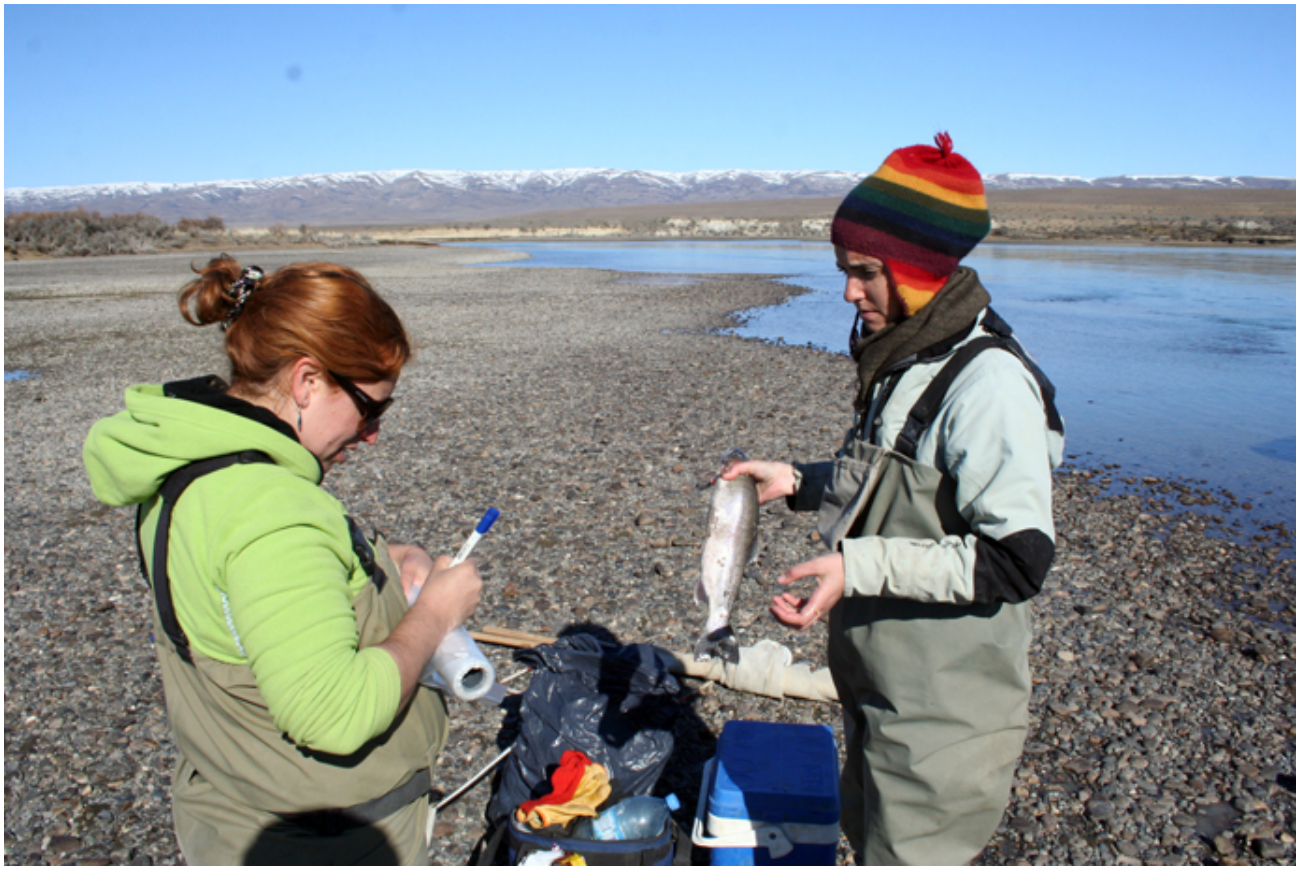
Hugo L. López
y
Justina Ponte Gómez

Indizada en la base de datos ASFA C.S.A.
2014

Semblanzas Ictiológicas

Marina Tagliaferro



Septiembre en el Río Santa Cruz, provincia de Santa Cruz, Argentina, 2011
Marina Tagliaferro (izquierda) junto a Martina Voccia

Hugo L. López y Justina Ponte Gómez

ProBiota
División Zoología Vertebrados
Museo de La Plata
FCNyM, UNLP

Julio de 2014

Imagen de Tapa
Enero en el Río Santa Cruz, área denominada "Los Laberintos", provincia de Santa Cruz, Argentina, 2012

El tiempo acaso no exista. Es posible que no pase y sólo pasemos nosotros.

Tulio Carella

Cinco minutos bastan para soñar toda una vida, así de relativo es el tiempo.

Mario Benedetti

Semblanzas Ictiológicas

A través de esta serie intentaremos conocer diferentes facetas personales de los integrantes de nuestra "comunidad".

El cuestionario, además de su principal objetivo, con sus respuestas quizás nos ayude a encontrar entre nosotros puntos en común que vayan más allá de nuestros temas de trabajo y sea un aporte a futuros estudios históricos.

Esperamos que esta iniciativa pueda ser otro nexo entre los ictiólogos de la región, ya que consideramos que el resultado general trascendería nuestras fronteras.

Hugo L. López

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Título máximo, Facultad y Universidad: Doctor en Ciencias Biológicas, Facultad de Ciencias Exactas y Naturales (FCEyN), Universidad de Buenos Aires (UBA)

Posición laboral:

Lugar de trabajo:

Especialidad o línea de trabajo: Ecología acuática

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Cuestionario

-**Un libro**: *El mayor de mis defectos*, R. Fontanarrosa
-**Una película**: *Gato negro, gato blanco*; director: E. Kusturica
-**Un CD** : *Unza Unza time*, The No Smoking Orchestra
-**Un artista**: Emir Kusturica
-**Un deporte**: natación
-**Un color**: verde, blanco, azul
-**Una comida**: pasta
-**Un animal**: mi perro
-**Una palabra**: tranquilidad
-**Un número**: 3
-**Una imagen**: el mar
-**Un lugar**: Sierras de Córdoba
-**Una estación del año**: otoño
-**Un nombre**: Marina
-**Un hombre**: mi padre
-**Una mujer**: todas las Madres y Abuelas
-**Un ictiólogo/a del pasado:** Holmberg
-**Un ictiólogo/a del presente:** Don Gunderson
-**Un personaje de ficción**: Dr. House
-**Un superhéroe**: Stephen Hawking

Marina Tagliaferro en Río Ceballos, Córdoba, Argentina, 1987

Limnologica 43 (2013) 500–509

Contents lists available at SciVerse ScienceDirect

Limnologica

journal homepage: www.elsevier.com/locate/limno

Dams in the last large free-flowing rivers of Patagonia, the Santa Cruz River, environmental features, and macroinvertebrate community

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ARTICLE INFO

Article history:
Received 20 November 2012
Received in revised form 16 April 2013
Accepted 16 April 2013
Available online 18 May 2013

Keywords:
Hydrology
Glacier rivers
Habitat

ABSTRACT

Three large rivers have their headwaters in the Patagonian Ice Fields (PIFs) in the Andes Mountains, the largest mid-latitude ice masses on Earth: Santa Cruz, Baker and Pascua. They are the last large free flowing rivers in Patagonia, but plans are advanced for building dams for hydroelectric power generation. The three PIF rivers, with a discharge dominated by ice melt, share a common, unique hydrograph compared to that of the other eight large rivers in the region: a distinct seasonal cycle, and an extremely stable discharge, with much lower variability than other rivers. In this study we present the first extensive survey of habitats and benthic macroinvertebrates in the least studied system, the Santa Cruz River. We assess how much of the natural capital provided and sustained by benthic invertebrates are expected to be lost by flooding and discuss how dams would affect riverine habitat and biota. In the Santa Cruz River, we conducted an intensive field survey during September 2010; a total of 52 sites located at regular 6 km intervals were sampled along the 310 river-km for macroinvertebrates and seventeen habitat variables. Although some habitat structure is apparent at the local scale, the Santa Cruz River could be described as very homogeneous. Macroinvertebrate density and the richness (38 genera) found in the Santa Cruz River resulted to be one of the lowest in comparison with 42 other Patagonian rivers. Albeit weak, the structure of the macroinvertebrates assemblages was successfully described by a reduced set of variables. The reduced flow variation and the lack of bed scouring flows have a direct and negative effect on the heterogeneity of riverbeds and banks. The high turbidity of the Santa Cruz River may also contribute to shorter food webs, by affecting autotrophic production, general trophic structure, and overall macroinvertebrate productivity and diversity. Dams will obliterate 51% of the lotic environment, including the most productive sections of the river according to our macroinvertebrate data. Since Santa Cruz River has a naturally homogeneous flow cycle, dams may provide more variable flows and more diverse habitat. Our data provide critically valuable baseline information to understand the effects of dams on the unique set of glacial driven large rivers of Patagonia.

Introduction

The Patagonian Ice Fields (PIFs) in the Andes Mountains of Chile and Argentina, the largest mid-latitude ice masses on Earth, dominate the discharge of rivers in South America south of 45° S (Barnett et al. 2005; Rivera et al. 2005). Three large rivers have their headwaters in the Ice Fields: Santa Cruz in Argentina, and Baker and Pascua in Chile; mean annual discharge of 691, 875, and 574 $m^3 s^{-1}$, respectively. Because of their remote location and the lack of supporting infrastructure, the three rivers have remained free of dams, something that is bound to change. Chile and Argentina will be building dams in all three rivers in the next ten years. Two dams programmed for the Santa Cruz River are projected to supply 16% of Argentina's hydropower (Quiroga 2008) and a series of five dams to be built in the Pascua and Baker rivers are expected to supply over 20% of Chile's hydropower (Endesa 2006).

Large glacial rivers, such as the Baker, Pascua and Santa Cruz rivers, are expected to have unique characteristics. Glacial regimes provide a strong regulation of discharge, high water volumes will buffer temperature, and turbidity will hamper primary production (Johnson et al. 1995); all these characteristics will project to river ecosystem functions (Puckridge et al. 1998). Glacier rivers also have a predictable flood pulse which allows both aquatic and terrestrial organisms to adapt to the pulse (Milner et al. 2009; Sparks 1995). The poor knowledge of the biological role of natural flow regimes and the reduced integrity of the world's large undisturbed rivers have led many researches to emphasize the importance of studying the few remaining unregulated rivers (Biggs et al. 2005; Glova and Duncan 1985; Puckridge et al. 1998; Sparks 1995; Welcomme 1995) and the modifications produced by dams (Bunn

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0075-9511/$ – see front matter © 2013 Elsevier GmbH. All rights reserved.
http://dx.doi.org/10.1016/j.limno.2013.04.002

Environment and Natural Resources Research; Vol. 4, No. 1; 2014
ISSN 1927-0488 E-ISSN 1927-0496
Published by Canadian Center of Science and Education

Spatial Pattern and Habitat Requirements of *Galaxias maculatus* in the Last Un-Interrupted Large River of Patagonia: A Baseline for Management

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Received: December 26, 2013 Accepted: January 20, 2014 Online Published: January 26, 2014

doi:10.5539/enrr.v4n1p54 URL: http://dx.doi.org/10.5539/enrr.v4n1p54

Abstract

The relationship between the native *Galaxias maculatus* and environmental variables was studied in 52 sites located along 306 km of the main stemof the Santa Cruz River, the second largest river in Argentinean Patagonia. The abundance varied along the river, with three general sections clearly defined: upstream with minimum abundance increasing towards midstream and downstream areas. Distance to the sea and river wet width which were negatively significantly associated with abundance,and maximum depth explained the abundance in a polynomial shape – achieving a total explanation of 41.1%. The best predictive model also combined the river sinuosity.Our results suggested that the construction of two proposed hydroelectric dams will modify these variables, which might generate changes in *G. maculatus* distribution. The information obtainedduring the present study represents valuable information for conservation management of this species.

Keywords: habitat, Galaxiid, large river, Patagonia, GLM, dams

1. Introduction

In lotic ecosystems, biological communities are structured primarily by physical habitat (Hynes, 1970). Habitat disturbance has an important role in constraining the types of ecological processes and patterns observed in streams (Ward & Stanford, 1983; Power et al., 1988; Resh et al., 1988; Poff & Ward, 1990). Understanding the habitat requirements of each species and the relationship with environmental variables is critical to comprehending their ecology in natural systems and to evaluate possible change scenarios (Argent, Bishop, Stauffer, Carline, & Myers, 2003; Jowett, Richardson, & Bonnett, 2005).

Galaxiid srepresent one of the most abundant native fish species from Southern Hemispherefreshwaters (McDowall, 1990). Each galaxiid species has a habitat preference, being defined by the main variables identified as affecting its distribution: local and maximum depth, channel width, substrate size (Ault & White, 1994; Allibone & Townsend, 1997), current speed (García, González, & Habit, 2012; Bonnet & Sykes, 2002), and proximity to the sea (Bonnet & Sykes, 2002; Eikaas, Kliskey, & McIntosh, 2005). The type of habitat used by one species might also change in the presence of invasive species or along ontogeny (Hale, Downes, & Swearer, 2008; Jellyman & McIntosh, 2008).

The most abundant galaxiid species in Patagonia, *Galaxias maculatus*, whichexhibits two life-history strategies (land-lockedand diadromous individuals; McDowall, 1990; Carrea et al., 2013) was studied along 306 km of the main stem of the Santa Cruz River. Since two hydroelectric dams will be built soon and little is known about the local wildlife and the environment the aim of this study was to identify environmental variables that may affect the abundance of *G. maculatus* and the shape of the response by using generalized linear models (GLM). Secondly, we sought to identify the model that best predictedthe likely responses of the fish to possible change scenarios.

The information on the un-degraded river condition is generally limited or absent, which make it difficult to determine appropriate restoration strategies. We expect the present research to generate useful information to evaluate conservation and management strategies.

RV Centennial, University of Washington, marzo de 2004
Preparando la separación de un arrastre en las Islas San Juan, WA, EE.UU.
Marina Tagliaferro, primer plano a la izquierda; Kathy Ireland a la derecha, atrás

Agosto en el Río Santa Cruz, provincia de Santa Cruz, Argentina,2009
Marina Tagliaferro (izquierda) junto a Celia Beloso

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Esta publicación debe citarse:

López, H. L. & J. Ponte Gómez. 2014. Semblanzas Ictiológicas: *Marina Tagliaferro*. *ProBiota*, FCNyM, UNLP, La Plata, Argentina, *Serie Técnica y Didáctica* 21(46): 1-12. ISSN 1515-9329.

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(Programa para el estudio y uso sustentable de la biota austral)

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Versión electrónica, diseño y composición

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