Soil erosion, reservoir lake infill and coastal erosion in the Mediterranean coast of southern Spain.

José Luis del Río¹, Fatima Navas², and Gonzalo Malvarez²

¹Regional Government of Andalucia Department of Agriculture Fishing and Sustainable Development ²Universidad Pablo de Olavide

October 31, 2021

Abstract

The combination of vigorous terrain and millenary human action has produced major changes in vegetation cover, impacting soil losses from slopes and, consequently, sediment production. Increasing focus in the management of water resources led to the widespread construction of dams to generate water flows for iron production, irrigation and to satisfy the increasing demand of the massive urban development along the Costa del Sol. To investigate the connection between soil degradation and loss and river sediment transport retention at a major dam, a first-order sediment yield prediction was established by using a GIS-based model at river basin scale. A quantitative validation of model results is provided by empirical measurements of sedimentation in the main reservoir lake of La Concepción using D_GPS/Echo sounder combination and a Remotely Piloted Aircraft compared with pre-construction blue print topography aimed at documenting spot heights where sediments accumulated or eroded over 50 years. The significant erodibility that we have estimated seems matched by potentially high sediment accumulation rates along selected profiles and spot heights across the bottom of the reservoir lake. Our study discusses that Mediterranean coastal systems may no longer stay in the resilience envelope set by a critically delicate sediment transport balance and without engineering support in the form of direct sediment feeding to the marine system by the permanent nourishment works required. Due to soil loss, sediment entrapment in reservoirs and water management policies, the coastal protection offered by the natural resilience of the beach and dune system is no longer recoverable.

Hosted file

Del Rio, Navas & Malvarez. Soil erosion, reservoir lake infill and coastal erosion in the Med coast of available at https://authorea.com/users/443810/articles/543718-soil-erosion-reservoir-lake-infill-and-coastal-erosion-in-the-mediterranean-coast-of-southern-spain



River Guadalmina

10

Kn















lar'
nin
pre
9
5
ma
æ
0a1
red
lew
ev.
1
96
d
0ee
-
no
33
l b
ğ
÷
LIT.
de.
D.
20
L'hi
1
1
12
12
6.7
83
98
49.
68
55
163
3
/a
541
53
0
01
01
S::/
tt
д
n. —
sion
nission. —
ermission
permission. —
out permission. —
thout permission. —
without permission. —
se without permission. —
euse without permission. —
o reuse without permission
. No reuse without permission. —
ed. No reuse without permission. —
rved. No reuse without permission. —
eserved. No reuse without permission. —
s reserved. No reuse without permission. —
yhts reserved. No reuse without permission. —
rights reserved. No reuse without permission. $-\!-$
All rights reserved. No reuse without permission. —
. All rights reserved. No reuse without permission. —
der. All rights reserved. No reuse without permission. —
under. All rights reserved. No reuse without permission. —
/funder. All rights reserved. No reuse without permission. —
hor/funder. All rights reserved. No reuse without permission. —
uthor/funder. All rights reserved. No reuse without permission. —
s author/funder. All rights reserved. No reuse without permission. —
the author/funder. All rights reserved. No reuse without permission. $-\!-$
is the author/funder. All rights reserved. No reuse without permission. $-\!-$
er is the author/funder. All rights reserved. No reuse without permission. $-\!-$
older is the author/funder. All rights reserved. No reuse without permission. —
holder is the author/funder. All rights reserved. No reuse without permission. $-\!-$
ght holder is the author/funder. All rights reserved. No reuse without permission. $$
right holder is the author/funder. All rights reserved. No reuse without permission. $$
opyright holder is the author/funder. All rights reserved. No reuse without permission. —
s copyright holder is the author/funder. All rights reserved. No reuse without permission. —
The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
- The copyright holder is the author/funder. All rights reserved. No reuse without permission
I — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
121- The copyright holder is the author/funder. All rights reserved. No reuse without permission
$\pm 2021 - $ The copyright holder is the author/funder. All rights reserved. No reuse without permission. $-$
0ct 2021 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
1 Oct 2021 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
, 31 Oct 2021 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
rea 31 Oct $2021 - $ The copyright holder is the author/funder. All rights reserved. No reuse without permission. $-$
horea 31 Oct $2021 - $ The copyright holder is the author/funder. All rights reserved. No reuse without permission. $-$
uthorea 31 Oct $2021 - $ The copyright holder is the author/funder. All rights reserved. No reuse without permission. $-$
$_{1}$ Authorea 31 Oct 2021 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
on Authorea 31 Oct 2021 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —
ed on Authorea 31 Oct 2021 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. —