



INSTRUMENT NAME: 4.4 TRANSFER-BASED INSTRUMENTS: WATER QUALITY TRADING SYSTEMS

Pondscape-specific definition: Transfer-based instruments consist of pondscape landowner/managers providing a verified level of an ecosystem service (e.g. carbon sequestration) in return for tradeable certificates, which they can then sell to buyers either bilaterally or through a market. To earn certificates, landowner/managers generally must implement specific methodologies that specify monitoring, reporting, and verification guidelines, alongside other rules. Markets can be voluntary markets (where buyers voluntarily purchase certificates) or compliance markets (where buyers are obligated to purchase certificates to meet regulatory requirements).

Water quality trading systems are a mandatory transfer-based instrument where a government sets a limit on the total amount of pollution (a ‘cap’) and require polluters to meet this cap by either reducing their own pollution and/or by purchasing pollution reduction credits from other actors who have reduced their pollution (Faeth 2000). NbS landowners/managers can finance their projects by selling credits (also called allowances or certificates), which they receive for mitigating pollution, either based on inputs (e.g. implementation of specific measure, such as building a pond) or on results (e.g. estimated impact of pond management on water quality). Common pollutants targeted include phosphorus or nitrogen, but other examples include temperature, salinity, and temperature (Salzman et al 2018). In return for mitigating pollution, landowners/managers receive nutrient trading credits, which can be sold to buyers who are regulatorily obliged to offset their existing or wish to increase their own discharge of pollutants (e.g. sewerage plants or other regulated entities).

CATEGORY	Tradable rights/permits and payments for ecosystem services			
ALSO-KNOWN-AS				
RELATED INSTRUMENTS	Payment for Ecosystem Services (PES); Voluntary carbon markets; Biodiversity offsets and habitat banking			
APPROPRIATE FOR: Who can use this type of financing instrument?	Pondscape developer	NGOs and non-profits	Local/city/regional govt. and agencies	National govt. and public agencies
SOURCE OF FINANCE: Who provides the finance?	Regulated entities obliged to reduce or offset their water pollution, e.g. sewerage plants			
PAYMENT FORM: What form is the payment?	Credit or certificate, equivalent to a set level of pollution reductions (which can then be sold for cash).			
IN RETURN FOR WHAT? What is the NBS project obliged to deliver in return?	Ecosystem-service provision – water quality improvement (e.g. through reduced nutrient pollution).			
RECIPIENT REQUIREMENTS: What requirements must recipients meet to receive finance?	Any landowner can participate.			
PROJECT REQUIREMENTS: What requirements must the pondscape project meet?	<p>If <u>input-based</u> (i.e. pondscape developer receives payment for taking actions e.g. installing ponds), then fewer requirements (just have to demonstrate you have taken actions that will lead to water quality improvement).</p> <p>If <u>result-based</u>, impact must be measurable: The pondscape project needs to be able to demonstrate measurable change or continuation of water quality improvements. This can increase complexity and cost for NbS providers.</p>			
OTHER REQUIREMENTS: What additional requirements are attached to the financing?	<p>- Access to water quality trading market, which do not currently exist in the EU.</p> <p>- Landowners may have to finance the development of the project upfront (and verify results) before receiving offset credits or certificates that they can sell.</p>			





SPEED: How quickly do recipients receive money?	Fast (<4months) – Medium(5-12months) – Slow (12months+)			
FUNDING TIMELINE: When does the recipient receive the funding?	One-off or ongoing. Some biodiversity offset payments occur only once, while others are structured to provide long-term annual payments for landowners.			
NBS TYPE: What types of NBS is the financing for?	Pondscape <u>creation</u>	Pondscape <u>restoration</u>		Pondscape <u>management</u>
SCALES: What scale of financing?	Small (<€10k)	Medium (€10k-€99k)	Large (€100k-€999k)	Very large (€1million+)
COMPLEXITY: How complex is applying for the finance	Simple		Medium	Complex
EXIST NOW IN EU?	Yes		No	
REFERENCES:	Faeth (2000) Fertile ground: Nutrient trading’s potential to cost-effectively improve water quality. World Resources Institute. ISBN: 1-56973-197-7 Salzman, James; Bennett, Genevieve; Carroll, Nathaniel; Goldstein, Allie; Jenkins, Michael (2018) The global status and trends of Payments for Ecosystem Services. Nature Sustainability, 1. https://doi.org/10.1038/s41893-018-0033-0			





Instrument: 4.4 Transfer-based instruments: Water quality trading market example

Example name: 4.4.1 Pennsylvania Nutrient Trading Program, USA

Example description: The Pennsylvania Nutrient Trading Program was established to more cost-efficiently meet nutrient pollution reduction targets in the Chesapeake Bay watershed. It allows regulated point sources (i.e. sewerage plants) to comply with their nutrient reduction targets through nutrient reduction credits that they purchase from farmers. Farmers receive payments for these nutrient reduction credits, which they generate and can use to pay for reducing nutrient pollution by implementing best management practices, such as manure storage and streamway management. The nutrient reductions are calculated using an online tool.

NBS DESCRIPTION							
LOCATION	Pennsylvania, USA						
NBS TYPE	<table border="1"> <thead> <tr> <th>Creation</th> <th>Restoration</th> <th>Management</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Creation	Restoration	Management			
Creation	Restoration	Management					
ECOSYSTEM TYPE	Stream, Agricultural ponds						
NBS BENEFITS	Water quality improvement.						
NBS DESCRIPTION	Improved management of farms, including manure and waste management, decreases nutrient leaching and pollution of watershed waterways.						
SCALE (SIZE)	22,600 square miles (Pennsylvania part of the Chesapeake Bay watershed); individual farm sizes vary.						
NBS PERFORMANCE CRITERIA	Performance is assessed through a credit system (see below).						
NBS PERFORMANCE	In 2020, non-point sources generated 1,377,000 nitrogen reduction credits (equivalent to a pound of nitrogen) leaching and 89,000 phosphorus credits (equivalent to a pound of phosphorus).						
FINANCING DESCRIPTION							
SOURCE OF FINANCING	Private: Point sources who purchase nutrient credits (e.g. regulated sources of nutrient pollution such as sewerage plants)						
RECIPIENT	Farmers (who reduce nutrient pollution through implementation of farm best management practices)						
SCALE (FINANCING)	Per farm/project: Small (e.g. \$300) – medium (\$70,000) ¹						
TIMELINE	Annual payments based upon implemented Best Management Practices						
FINANCING REQUIREMENTS	Farmer must demonstrate nutrient impact using Chesapeake Bay Nutrient Tracking Tool, which models nutrient reductions based upon farm management. Must also submit verification/validation plan and will be subject to verification/validation by administrators, including data collection and reporting, site visit. Farmer must also find a buyer for credits (through auction facilitated by administrators)						
FINANCING PERFORMANCE	Historical auction data shows price per credit (i.e. per pound) ranges around \$1-3.						
TRANSACTION COSTS	For farmers, transaction costs include the cost of identifying practices to implement, calculating and verifying nutrient pollution reductions, and trading. These are estimated to be relatively low, approximately \$0.25 per credit (Ribaud & McCann, 2012).						

¹ Based upon Current PA Nonpoint Source Certified Generator offers of approx. 150-34,000 pounds/participant, and credit price of \$2.





REFERENCE

IHSMarkit(2022) Environmental Registry (webpage). Accessed 04.08.2022. Available <https://ihsmarkit.com/products/environmental-registry.html>

Ribaudo, M., and McCann, LMJ (2012) Accounting for Transaction Costs in Point/Nonpoint Water Quality Trading Programs in the Chesapeake Bay Watershed. Conference paper, 2012 Agricultural and Applied Economics Association Conference. DOI: 10.22004/ag.econ.123509

Pennsylvania Department of Environmental Protection (2020) Current PA Nonpoint Source Certified Generators 2020. Accessed 04.08.2022. Available: https://files.dep.state.pa.us/Water/BNPNSM/NutrientTrading/NutrientCreditRegistry/NPS_Generators.pdf

Pennsylvania Department of Environmental Protection (2022) Nutrient Credit Trading (webpage). Accessed 04.08.2022. Available: <https://www.dep.pa.gov/Business/Water/CleanWater/NutrientTrading/Pages/default.aspx>

