COMMON QUESTIONS:

# WETLAND GUIDANCE FOR ENGINEERS


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# PREFACE

This guide is designed for engineers (civil, sanitary, other) wishing to undertake activities which may impact wetlands or who wish to utilize wetlands in meeting various project goals (e.g., pollution control). It addresses frequently asked engineering-related questions concerning wetland protection, restoration, and construction. A selected bibliography and list of web sites provide the reader with more information concerning specific subjects. We also draw your attention, particularly, to other more specific guides in this series which deal with federal, state, and local regulatory programs, wetland assessment, wetland restoration, stream restoration, wetlands and watershed management, and legal issues.

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*Photos in this report are mostly derived from websites. Please let us know, if you do not wish your photo to be included in this brochure.*

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*Photo on page 2, Source Unknown*

*Photo on page 4 by Middle South Platte River Wetlands Mitigation Bank, The Need for Mitigation. http://www.coloradowetlandbank.com/pages/genoverview.html*

*Map on page 6 by New York Department of Environmental Conservation*

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# COMMON QUESTIONS:
# WETLAND GUIDANCE FOR ENGINEERS

**Do I, as an engineer, need to be concerned about wetlands in project planning?**

**A.** Often, yes.

If you are planning an activity or structure in or near a wetland, you may be able to utilize natural, created, or enhanced wetlands to help achieve your project goals. For example, an existing, restored, constructed or enhanced wetland may store floodwaters for flood control or stormwater purposes. An existing, restored, constructed, or enhanced wetland may reduce water pollution for a water supply reservoir, stormwater management facility, or a lake, river or stream. An existing or constructed wetland may reduce erosion and sediment problems for adjacent development project. An existing, restored or constructed wetland may provide recreation and ecotourism opportunities for a subdivision or municipal government.

In many instances you will also need a federal, state, and sometimes a local regulatory permit if you are proposing to construct a road, dam, stormwater detention area, dike, levee, utility pipeline, or structure in a wetland, to place a fill in a wetland, to drain a wetland, or to conduct other activities in a wetland which damage or destroy a wetland. To obtain a permit you will typically need to show that the proposed activity could not be practically undertaken at another location, the measures are undertaken to reduce impacts, and that (in many instances) measures are also taken to compensate for impacts.

Even if you are not subject to regulatory permit requirements, you may need to prepare a federal Environmental Impact Statement or a comparable state or local impact statement if you are undertaking an activity which may damage or destroy a wetland.

If you are planning an activity or structure in a wetland, you will also need to address potential flooding, erosion, and soil bearing capacity problems which may affect your activity or structure. You will also need to be concerned with potential legal liability if your project may increase potential flooding and other problems on other properties.

*Wetlands can be an asset to nearby development*

**May you be held liable for increasing naturally occurring flood or erosion hazards on other lands caused by an activity in a wetland?**

**A.** You can be held legally liable by your client or third parties if your project increases erosion or flood hazards on adjacent lands by obstructing flood flows in a wetland, floodplain, or stream. Courts have often held governmental units and private individuals liable for increasing flood or erosion hazards on private lands. See J. Kusler, Landowner Liability for Draining or Filling Wetlands (question and answer brochure in this series). Liability often occurs as governments and individuals construct roads, bridges, ditches, sidewalks, dikes, levees, stormwater systems and other government facilities which alter and increase natural runoff or erosion. Courts have held government units and individuals liable under a variety of legal theories including riparian rights, nuisance, trespass, negligence, strict liability, and "taking" private property without payment of just compensation (governmental units only).

**What is a wetland?**

**A.** A number of slightly different definitions of wetland are used in federal, state, and local regulatory, planning, and other management programs. There is no universally accepted definition of "wetland". But, most definitions are quite similar. Slightly different definitions are used by the U.S. Fish and Wildlife Service (FWS) for the National Wetland Inventory (NWI) for wetland mapping, the USDA Natural Resources Conservation Service for the Wetland Reserve and Swampbuster Programs, and the U.S. Army Corps of Engineers (Corps) for Section 404 and Section 10 regulatory permitting. States and local governments also often have their own wetland definitions.

Despite small differences, regulatory and other statutes and regulations usually define wetlands in similar ways. Wetlands are typically defined as areas subject to high ground water or surface inundation resulting in the growth of hydrophytic plants and the development of hydric soils. The vast majority of wetland maps and delineations utilizing the various definitions overlap. Differences, however, appear along the deep water boundary because some definitions limit wetlands to areas of shallow inundation while others extend the wetland boundary to two to six meters. Differences also appear along the upland boundary for low gradient wetlands and for wetlands subject to infrequent inundation such as some flats and depressional wetlands. Here the number of days of inundation, the precise mixture of hydrophytic and upland plants, and the precise soil characteristics make a difference in the location of the boundary.

*Evaluating a wetland*

**Why are wetlands regulated at federal, state, and local levels?**

**A.** Alteration or destruction of wetlands is regulated because wetlands have substantial functions of value to society. Activities in wetlands are also subject to a variety of natural hazards and may increase natural hazards on other lands as discussed above.

**Do I need a permit for all types of activities in wetlands?**

**A.** No. Regulations typically exempt many open space activities and some other activities in wetlands. Federal, state, and local programs exempt minor activities and repairs to existing facilitates even in regulated wetlands. However, major fills and some types of drainage with incidental fallback are regulated. The federal Section 404 program regulates fills but not all drainage if conducted without any incidental fallback. The federal Section 404 program and some state wetland programs have issued "general" or "nationwide" permits for many smaller activities. These do not require an individual permit but impose conditions on activities in wetlands. Regulations also typically apply to some types but not other types of wetlands. Federal, state, and local regulations apply to virtually all wetlands in or adjacent to lakes, permanent rivers, and the oceans. These areas are regulated by the federal government, states, and in some instances local governments. See other guides in this series addressing state and local regulatory programs. However, activities in many "isolated" wetlands are not regulated by the federal Section 404 program. Many smaller, freshwater wetlands are also not regulated by state and local programs.

If you are in doubt with regard to what is regulated and unregulated, in a particular instance, we suggest you contact the federal, state, and local regulatory offices which may have jurisdiction and request them to make the regulatory jurisdiction call.

**Where do I get information concerning wetland regulators at various levels of government applicable to my site?**

**A.** For federal regulations we recommend that you contact the following web sites:

- U.S. Army Corps of Engineers http://www.usace.army.mil/
- U.S. Environmental Protection Agency http://www.epa.gov

For state regulations we suggest you contact:

- Association of State Wetland Managers – http://www.aswm.org
- Construction Industry Compliance Assistance, State Wetland Information Tool. State-by state description of state wetland programs. http://www.cicacenter.org/swift.html

For local regulations we suggest you contact your local zoning administrator or planning board.

**What regulatory standards must my project meet?**

**A.** The regulatory standards which your project must meet will, of course, depend upon federal, state, and local regulations in effect for the specific area of your project. Regulatory standards differ somewhat from state to state and local government to local government.

If your project requires a federal Section 404 program permit, you must demonstrate that there are no practical alternatives to a wetland location and that you have taken measures to reduce impacts. You also must, in general, demonstrate that there will be no net loss of wetland functions and values. You need to demonstrate that the project will not increase flooding and other natural hazards. You must demonstrate that the project will be in the "public interest" taking into account a broad range of factors set forth in Corps and U.S. Environmental Protection Agency (EPA) guidelines.

State and local permitting criteria are more varied. Often you must demonstrate that the proposed project will not have adverse impact on specific wetland functions such as fisheries or recreational functions. You must often demonstrate no net loss of wetland functions, values, and acreage. Some local regulations prohibit all fills or drainage unless you can show that denial of a permit will deny all economic use of your entire property.

**Is it difficult to obtain a permit?**

**A.** This depends upon the Corps of Engineers District, the state and locality, the type of the proposed activity, the size of the activity, the magnitude of its impact, whether the impact is permanent or temporary, whether compensatory mitigation is proposed and other factors.

It will often be very difficult to obtain a permit to fill, drain or otherwise destroy a large wetland. It will be very difficult or impossible to obtain a permit to alter a wetland which contains an endangered plant or animal species. It will be very difficult to obtain a permit to fill, drain, or otherwise alter a rare type of wetland such as a bog. It will often be difficult to obtain a permit to substantially alter a wetland in or adjacent to a navigable lake, river or stream. It will often be difficult to obtain a permit for a large-scale activity in a wetland such as a road or solid waste disposal site which affects substantial wetland acreage.

At the federal level, most permit applications for federal Section 404 permits are ultimately issued by the Corps, usually with the attachment of conditions. At the state level, many permits are also conditionally issued. There is less uniformity in local regulations. Some local governments prohibit most activities in wetlands; others conditionally allow a broad range of activities.

*A mitigation bank*

The degree and type of protection afforded isolated wetlands differs widely from state to state. Some states prohibit virtually all fills and drainage in isolated wetlands. Others limit their regulations to larger isolated wetlands and to specific types of activities. Check with your state natural resource or water agency for state regulations.

Local wetland regulations for isolated wetlands are highly varied. Local regulations often apply only to all major wetlands along lakes, rivers, and streams. Check with your local zoning administrator for local regulations.

**If the regulatory agency denies a permit application, will this be a "taking" of my (or my client's) private property?**

**A.** Federal and state courts have broadly upheld federal, state, and local wetland regulations against Constitutional challenges including challenges that regulations are a "taking" of private property except where regulations deny all economic use of entire properties. Even then, courts have often sustained regulations if the proposed activities will threaten public safety or cause a nuisance. See J. Kusler, 2005. Common Legal Questions: Wetland Regulations in this series.

**How much fact-finding will my consultant or I need to undertake to obtain a permit?**

**A.** This will depend, again, upon the federal, state, and local regulations in effect for the area, the type and size of the project, whether compensatory mitigation is proposed, and other factors. In general, regulatory agencies require detailed fact-finding including preparation of environmental impact statements (or comparable reports) for large fills or drainage projects (e.g., tens or hundreds of acres), for projects which may impact rare wetland types or wetlands serving as habitat for rare or endangered species, or wetlands with a special issue or problem such as a proposed fill in a riverine wetland which serves as a flood conveyance area.

Regulatory agencies also typically require more detailed fact-finding if the project applicant proposes to carry out major wetland restoration, creation, or enhancement to compensate for losses.

*Restoring fish habitat in a heavily impacted stream*

**How can I determine the functions and values of a particular wetland?**

**A.** There is no easy way to accurately describe functions, functional values, and values. Knowing the overall type of wetland (e.g., Hydrogeomorphic Class) and its location can **suggest** particular functions and values. For example, a wetland located immediately adjacent to a river will likely perform some flood conveyance function/value. Wetlands bordering lakes, streams, and the ocean often play erosion control and water quality protection functions/values. Virtually all types of wetlands throughout the landscape may serve habitat functions/values.

Knowing overall wetland type will not, however, provide a detailed picture of functions and values.

The most common method for assessing individual functions/values is to visit the wetland and to assess possible functions on a function-by-function basis based upon observed characteristics of the wetland and surrounding lands and waters. A variety of rapid, formal wetland assessment methods have been developed by scientists to help evaluate the functions and values of particular wetlands. (Bartoldus, 1999). All,

however, have proven subject to limitations. More detailed assessment methods which provide more accurate evaluation of specific functions are also available but are often expensive to apply. For example, hydrologic and hydraulic models may be used to evaluate flood conveyance and flood storage. WETTHINGS, Biocriteria, HEP, and other habitat evaluation models may be used to evaluate fisheries, amphibians, and other habitat functions.

See Common Questions: Wetland Assessment in this series for more information.

**Do regulators require that a particular wetland assessment method be used?**

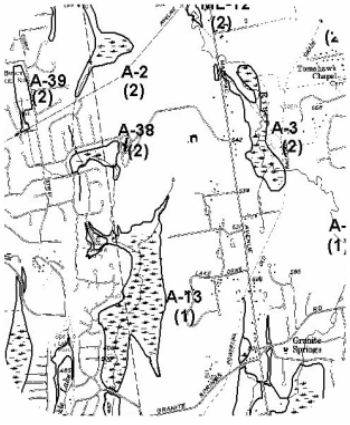
**A.** In general, no. Regulatory agencies at federal, state, and local levels have not endorsed a single wetland assessment method for regulatory purposes although the federal agencies expressed general support for the HGM method in 1997. Some states, like Florida, have adopted wetland assessment methods. The assessment and other fact-finding required by regulatory agencies at all levels depends upon the wetland regulations in effect for the area (state, local), specifics of the proposed activity, the type of wetland, and other factors.

**How do I find a consultant to help develop a permit application, develop a mitigation plan, assist me with regulatory permitting, or help implement restoration, creation or enhancement to compensate for losses?**

**A.** You might begin by calling your local federal, state, and local regulatory offices and asking for recommendations. Often regulators will not recommend a specific individual but may give you a list of consultants working in the area. A few states such as Michigan and Oregon have put together comprehensive lists of individuals and firms offering consulting services. Both lists are available on the web. The Sacramento District of the Corps has also assembled a list which is available on their web site.

A second option is to join the Society of Wetland Scientists. Members receive a directory of over 4,000 wetland scientists with names, addresses, telephone numbers, and in some instances e-mail addresses. The directory provides some limited information concerning areas of interests for listed individuals. The directory does not provide specific information on consulting services. But, you might skim these lists to find scientists who live and work in the project area and who work for consulting firms.

A third option is to look in the phone book for environmental consulting firms and then make some calls.



*Wetland map*

**Where can I obtain wetland maps?**

**A.** Wetland maps are available from several sources:

(1) Federal maps. National Wetland Inventory maps are available from the U.S. Fish and Wildlife Service. Digital maps are available from the NWI web site. See below.

(2) State wetland maps. These are generally available from the state Department of Natural Resources or Water Resources Agency. Some states have placed them online.

(3) Local maps. A small number of local governments have undertaken their own wetland mapping. Also, zoning maps showing wetland conservation zones may be available from the local (town, city, county, village) zoning administrator.

See Common Questions: Wetland Definition, Delineation, and Mapping in this series for more sources of information.

**Is it difficult to locate the boundaries of regulated wetlands?**

**A.** This depends. In many instances the location of the wetland boundary is quite easily identified. This is particularly true for coastal and estuarine wetlands where the high tide line is visible and the wetland is characterized by salt tolerant wetland plants which are easily identified. The boundary is also clear for many coastal, lakeshore, and riverine wetlands where there are bluffs or steep banks and a narrow transition area between wetland and upland.

However, boundaries are often difficult to locate in low gradient areas such as broad floodplains adjacent to rivers, lakes, and the oceans where the wetland gradually transitions into upland with no clear demarcation in plant species. Boundaries are also often difficult to determine where there are long term, major fluctuations in ground and surface water levels such as some Prairie Potholes and “flats” wetlands. They are often difficult to determine where subsurface drainage has occurred (e.g., agricultural tile) and the condition and effectiveness of the drainage is unclear. Finally, boundaries are often difficult to determine where urbanization, agriculture and other watershed conditions have dramatically changed the hydrology and areas are becoming wetter or dryer. Vegetation and soils may be a poor indicator or hydrology.

See Common Questions: Wetland Definition, Delineation, and Mapping in this series for more sources of information.

**How can I determine the exact boundary of a regulated wetland?**

**A.** The federal Section 404 program has not adopted regulatory maps. Most state and local wetland regulatory programs, however, have adopted regulatory maps. If you believe that your proposed activity may be located in a federally regulated wetland, you can request the Corps to determine the wetland boundaries at the site. However, due to heavy workloads, it may take many months for the Corps to make such a field determination.

The Corps in 1987 adopted a Wetland Delineation Manual which is used by the Corps and some other agencies in identifying wetlands subject to Section 404 permitting requirements and in determining precise boundaries. This manual uses three types of information simultaneously to identify a wetland—plants, hydrology, and soils.

If you believe that your proposed activity may be located in a federally regulated wetland, you can expedite the regulatory review process by contracting with a consultant to delineate wetland boundaries applying the 1987 Manual. You can then submit the delineation report to the Corps with your permit application.

Some Corps districts such as Sacramento have published on the web guidance for preparation of such a report. The Corps may choose not to accept the consultant report and carry out their own delineation.

Some states such as Michigan provide assistance to landowners in identifying wetland boundaries. A number of states such as Florida, New York, and Michigan have published their own wetland delineation manuals. Also some state and local wetland regulations only apply to areas which are mapped as wetlands on local or state regulatory maps. States and local governments also typically utilize plants, hydrology, and soils to determine more precisely the boundaries of mapped wetlands since wetland maps are typically at quite large scale.

**Is it possible to restore or create wetlands to compensate for damage or losses?**

**A.** Yes and no. It is often possible to restore or create wetlands with some wetland functions and values equaling or exceeding those of naturally occurring wetlands. In some instances the specific functions such as flood storage may exceed those of naturally occurring wetlands. However, it is difficult or impossible to restore or create other functions such as certain habitat or pollution control functions which depend upon mature wetland soils. Even if functions are replaced, the incidence of costs and benefits will often change if the restoration occurs at a site other than the original site.

See Common Questions: Wetland Restoration, Creation, and Enhancement in this series for more sources of information.

**What uses may be made of constructed wetlands?**

**A.** Constructed wetlands can be used for a broad range of purposes. Constructed wetlands are now often used for stormwater retention and detention. Constructed wetlands can also be designed to not only store and slowly release flood waters but remove sediment, litter, toxics, nutrients and other pollutants.

Constructed wetlands are also broadly used to treat domestic, and to some extent, industrial wastes.

Constructed wetlands are, in some instances, used for recreation purposes. Thousands of farm ponds have been created for water supply and recreation (fishing, swimming) purposes. Often farm ponds are now often designed with wetland areas.

Constructed wetlands are, in some instances, used by Duck Clubs, Conservation Commissions, not for profits and landowners to produce waterfowl and other wildlife for hunting and viewing purposes.

**What are the keys to successful restoration, creation, or enhancement projects?**

**A.** Keys to success restoration, creation, and enhancement projects include:

- Clearly defining project goals,
- Getting the hydrology “right”,
- Creating a self-sustaining system,
- Incorporating the capability for mid-course corrections in project design, and
- Protecting and managing the wetland (as needed) over time.

See Common Questions: Wetland Restoration, Creation, and Enhancement in this series for more sources of information.

**Where can I obtain design guidance for impact reduction measures and for the design of wetland restoration or creation projects?**

**A.** A number of publications are available which provide design guidance for wetland projects. See bibliography and contact your own state wetland office. See also Common Questions: Wetland Restoration, Creation and Enhancement in this series.

**Can I use a mitigation bank to compensate for project impacts?**

**A.** This depends upon a variety of factors including the specific types and magnitude of impacts posed by a proposed project, the regulatory standards in effect for the area, and the policies of the regulatory agencies. Many but not all regulatory agencies allow the use of mitigation banks to help compensate for certain types of habitat losses.

*Impact reduction measure*

Even if use or a mitigation bank is approved by a regulatory agency, the project sponsor must also typically carry out on site impact reduction and compensation measures. Regulatory agencies usually require onsite impact reduction and restoration measures for impacts which are unique to the setting such as potential increased flooding, erosion, and pollution, erosion on other properties or destruction of fish and other habitat for a particular water body. Buying mitigation credits in a mitigation bank tens of miles from an impacted site may help compensate for losses regionally but will be of little solace to landowners adjacent to a project site subject to increased flooding, erosion, or other losses.

**Where can I go to receive training in wetland impact assessment, impact reduction, and compensation (restoration, creation, enhancement)?**

**A.** Many universities such as Rutgers University, University of Wisconsin, Cornell, and Ohio State University offer wetland courses. The Corps offers a variety of wetland training courses. And, a number of consulting firms and not for profits offer wetland courses. The Association of State Wetland Managers also offers a number of wetland training courses each year. We have listed web sites for many of these courses. See below.

**Where do I go to get more information on wetland maps, delineation, restoration, and other aspects of wetland management?**

**A.** We have attached a list of suggested readings and a list of web sites which we have found useful.

*Wetland restoration*

## SUGGESTED READINGS

See other question and answer guides addressing frequently asked questions in this series.


Bartoldus, C. 1999. A Comprehensive Review of Wetland Assessment Procedures: A Guide for Wetland Practitioners. Environmental Concern, Inc. St. Michaels, MD.

Kadlec, R. and R. Knight. 1995. Treatment Wetlands: Theory and Implementation. Lewis Publishers. Boca Raton, Florida.

Kusler, J. & M. Kentula (eds.). 1990. Wetland Creation and Restoration: The Status of the Science. Island Press, Washington, D.C.

Mitch, W. and J. Gosslink. 1993. Wetlands 2nd Edition. Van Nostrand Reinhold, New York

Moshiri (ed.). 1994. Constructed Wetlands for Water Quality Improvement. Lewis Publishers. Boca Raton, Florida.

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Payne, N. 1992. Techniques for Wildlife Habitat Management of Wetlands. MaGraw-Hill, Inc. New York, New York.

Steinberg. 1991. Wetlands and Real Estate Development Handbook, 2nd Edition. Government Institutes. Rockville, Maryland.

Strand, M. 1996. Wetlands Deskbook. Environmental Law Institute, Washington, D.C.

Tiner, R. 1999. Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification, and Mapping. Lewis Publishers, Washington, D.C.

U.S. Environmental Protection Agency. 1990. Water Quality Standards for Wetlands. Office of Water Regulations and Standards. EPA/440/S-90-011. Washington, D.C.

U.S. Environmental Protection Agency. 1993. Natural Wetlands and Urban Stormwater: Potential Impacts and Management. Office of Wetlands, Oceans and Watersheds, Wetlands Division. Washington, D.C. 843-R-001.

Want, W. 2004 update. The Law of Wetland Regulation, Clark Boardman Callaghan

World Wildlife Fund. 1992. Statewide Wetland Strategies: A Guide to Protecting and Managing the Resource. Island Press. Washington, D.C.

## SUGGESTED WEB SITES

http://www.nrcs.usda.gov/technical/stream_restoration/
Stream Corridor Restoration by the Federal Interagency Stream Corridor Restoration Working Group. Stream Corridor Restoration: Principles, Processes, and Practices.

http://www.ibiblio.org/london/constructed-wetlands-links.html
Constructed wetlands links.

http://www.epa.gov/owow/wetlands/restore/
River Corridor and Wetland Restoration. U.S. Environmental Protection Agency

http://www.nal.usda.gov/wqic/Constructed_Wetlands_all/index.html
Water Quality Information Center. Constructed Wetlands Bibliography.

http://www.epa.gov/owow/wetlands/restore/links
Wetlands Restoration Links by State. U.S. Environmental Protection Agency

http://www.cicacenter.org/swift.html
Construction Industry Compliance Assistance, State Wetland Information Tool. State-by-state description of state wetland programs.

http://www.nal.usda.gov/wqic/Bibliographies/conwet2.html
Constructed Wetlands and Water Quality Improvement (II)

http://wetlands.fws.gov/
U.S. Fish and Wildlife Service National Wetlands Inventory

www.nwi.fws.gov/bha
National wetland plant lists. U.S. Fish and Wildlife Service, Branch of Habitat Assessment.

www.epa.gov/owow/wetlands
U.S. Environmental Protection Agency, Wetlands. Section 404 regulations.

www.wes.army.mil/el/wetlands/wetlands.html
U.S. Army Corps of Engineers Waterways Experiment Station, access to many reports including the 1987 Wetland Delineation Manual.

http://www.soils.usda.gov/use/hydric/
USDA Natural Resources Conservation Service, Hydric soils list.

http://plants.usda.gov/
USDA Natural Resources Conservation Service National Plants Database

http://www.aswm.org/propub/courts.pdf
Kusler, J. 2004. Final Report 2: Wetland Assessment in the Courts

http://www.floods.org/NoAdverseImpact/NAI_AND_THE_COURTS.pdf#search='No%20Adverse%20Impact%20Floodplain%20Management%20and%20the%20Courts'
Kusler, J. 2004. No Adverse Impact Floodplain Management and the Courts. Prepared for the Association of State Floodplain Managers, Madison, Wisconsin.

http://www.usace.army.mil/inet/functions/cw/cecwo/reg/
U.S. Army Corps of Engineers Regulatory web site. Searchable.

www.aswm.org
Association of State Wetland Managers web site. See publication list.

**Association of State Wetland Managers, Inc.**

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