
**2011
NATURAL RESOURCE ASSESSMENT
OXFORD COUNTY**



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**Oxford County Soil & Water Conservation District
Maine Association of Conservation Districts
USDA Natural Resources Conservation Service**

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Preface

Oxford County, which stretches 110 miles along the New Hampshire border from Porter, ME to Quebec, comprises most of Maine's western boundary. The county extends eastward from the New Hampshire border halfway across the state of Maine and consists of 37 small towns and villages nestled among rolling hills. Approximately 93% of the county is forest land, the northern part of which is some of the wildest in the state of Maine. Most of Oxford's historical industry is natural resource based, primarily on forest products both in wood products and pulp/paper. The Rumford area is known for its paper mills, while the Norway-South Paris-Oxford area has been known for its wood product manufacturing industries. Outdoor recreation and tourism have become mainstays of the county's economy due to Oxford County's abundant natural resources. Hundreds of lakes and ponds provide valuable fish habitat and excellent fishing opportunities. In summer the populations of many towns in the county triple with the return of summer visitors who enjoy swimming, boating and relaxing on Oxford's many pristine lakes. There are three major river watersheds which provide hundreds of miles of navigable waters for canoeing and kayaking. With abundant wildlife habitat, hunting is still a popular activity among both the native community and those "from away". Boasting 3 major downhill ski areas, numerous cross-country ski centers, and hundreds of miles of snowmobile trails, Oxford is also increasingly a winter destination.

Agriculture is also one of Oxford County's great assets, with the river bottom lands of the Saco and the Androscoggin Rivers providing some of the most fertile farming lands in the state. Agricultural farmland operations include cropland, hayland, forest land and pasture for livestock. Growth in Oxford County's population, economic changes, and increasing urbanization along some of its major transportation corridors have led to a decline in some natural resource land uses and have created natural resource issues. Since 1980 for example, the number of large agricultural farms has decreased in part due to increasing value of land and the decreasing economic value in farming. The pulp and paper industry has declined while the wood products and biomass industries have struggled to hold on. Increasing development pressures on our lake fronts have given rise to water quality issues which threaten to harm the very resource which attracted their development.

The future of Oxford County is heavily reliant on its natural resources economically. Like many counties in Maine, Oxford is facing "growing pains" and must now put heavy emphasis on proper planning and stewardship of their natural resources in order to remain sustainable into the future. It is hoped that this Natural Resource Assessment will serve as a first step in determining where to place our focus in the programs that the NRCS and the Oxford County Soil & Water Conservation District create to promote wise use and stewardship of our resources. This report contains the results of a locally led forum of concerned citizens, or stakeholders, to discuss and prioritize the natural resource concerns of Oxford County. It also contains input obtained through the distribution of a Natural Resource Survey (See Appendix E) distributed to people who live and work in Oxford County, many of whom had specific insights and interests in the various natural resource related issues facing the county.

Resource Assessment Summary Concerns of High Importance

Landscape	Natural Resource Concerns	Specific Issues
Non-irrigated and Irrigated Cropland		17,000 acres in the southwestern and central-northern portions of the county
	Water Quality Degradation - Excess nutrients in surface and ground waters; Pesticides transported to surface and ground waters; Soil Quality Degradation - Concentration of salts or other chemicals	Pesticides, nutrients impact water quality
Hay and Pasture	Soil Quality Degradation - Organic matter depletion; Water Quality Degradation - Excess nutrients	Prescribed grazing
Forest	Water Quality Degradation - Excessive sediment in surface waters; Excess Water - Ponding, flooding	Road maintenance and forestry practice issues
Headquarters, Farmsteads, Concentrated Livestock Areas	Water Quality Degradation - Excess nutrients and sediment	Concentrations of buildings and impervious surfaces contribute to non-point contamination of surface and ground waters
	Water Quality Degradation; Excess Water	excessive runoff, inadequate outlets
	Livestock Production Limitation - Inadequate livestock shelter; Inadequate livestock water	Inadequate shelter, water, and space for domestic animals

Urban	Water Quality Degradation; Excess Water; Soil Erosion - Concentrated flow erosion; Excessive bank erosion from streams, shorelines, or water conveyance channels	Impervious areas and roads contribute excess runoff and pollutants to water bodies
Water	Water Quality Degradation - Excessive sediment in surface waters	Lake shoreland erosion problems; sediment and turbidity in surface water
Wildlife	Inadequate Habitat For Fish and Wildlife - Habitat degradation	Fragmentation of forest habitat
	Inadequate Habitat For Fish and Wildlife - Habitat degradation	Urban/suburban displacement of wildlife from habitats
	Inadequate Habitat For Fish and Wildlife - Habitat degradation	Human created structures prohibiting migration

Water Landscape

Overview of landscape

Oxford County is blessed with a multitude of lakes and ponds, which makes it a summer vacation destination for thousands of visitors to Oxford County every year. Our water resources provide residents and visitors with recreational opportunities such as swimming, boating, fishing, canoeing and kayaking. The economic value of water-based outdoor recreation is ever increasing.

There are 3 major river watersheds in Oxford County: The Saco River, the Androscoggin River, and the Crooked River (which is part of the Upper Presumpscot River/Sebago Lake Watershed). These river systems provide hundreds of miles of navigable water ways for recreational purposes and valuable aquatic habitat for fish and wildlife.

Our groundwater is an unseen but increasingly valuable asset. The sand and gravel aquifers of Oxford County are a legacy of our glacial history and provide our county with some of the purest drinking water in the country. It is increasingly harvested by the bottled water industry which thrives on this seemingly abundant resource.

Critical Current and Future Issues

- The Saco River has long been known for its recreational uses and high water quality. It has an attainment class of “A” in its upper section which lies in Oxford County. It is currently in danger of being “loved to death”. Trash and waste from recreational use are a growing problem.
- Current agricultural land uses adjacent to the Saco also have potential to have negative impacts on water quality; fertilizers and pesticides must be judiciously applied and livestock waste must be managed properly.
- The Androscoggin River, which had been declining in water quality until the late seventies, has shown steady improvement. The river originates in northern Oxford County in Umbagog Lake winds through northern New Hampshire and reenters Maine in Gilead. It has an attainment class of “B” for all uses from Gilead downstream to Rumford. Below Rumford the Androscoggin River is classified as “C” due to water quality issues related to “legacy pollutants” from the historical waste dumping from the pulp and paper industry, as well as dam created impoundments intended to provide hydropower. These impoundments have caused low dissolved oxygen environments in the river ecosystem, which are harmful to aquatic life.
- The Crooked River has recently been identified as one of most “at risk” river watersheds in the United States due to the fact that it is the primary drinking water source of a large population (Portland) and is at risk of development pressure which may threaten its pristine quality. It is currently rated “AA”, which is the highest water quality attainment class. Although the vast majority of the land in the Crooked River watershed is forestland, it is also privately owned with no assurances of protection.
- Ground water issues have also come to light in recent years related not only to water quality protection, but to concerns about depletion and water rights. In the Fryeburg area there is great concern due to Nestle Waters high volume ground water pumping operations.
- Our lakes and ponds are also at risk from many factors relating to NPS pollution, aquatic invasive plants such as Eurasian milfoil, and erosion of shorelines due to storm water runoff, lack of vegetative buffers and in some cases improper lake level management.
- It was found in Oxford County’s Natural Resource Assessment public forum and surveys that Water Quality was the issue of greatest concern.

Opportunities for NRCS and SWCD Involvement for the next 5 years

- Regarding the Crooked River, efforts are under way by the local land trusts, the Maine DEP and Maine Forest Service to increase awareness and promote the stewardship of this critical watershed. The NRCS and Oxford County SWCD are partners in these efforts and can promote development of forest management plans and use of forest implementation practices.
- Continuing efforts by groups such as the Androscoggin River Watershed Council have focused positive attention on the importance of stewardship of the Androscoggin River.
- Develop workshops for landowners to educate about proper fertilizer application, as well as potential damages caused by over application. Focus, also, on economy/savings of appropriate fertilizer application.

Forest Landscape

Overview of landscape

Over 93% percent of Oxford County is forest land making it the most dominant natural resource landscape in the County. A small amount, 53,100 acres, on the western border is owned and managed by the US Forest Service and the rest is owned privately by individuals and commercial business interests.

Oxford County has long had a forest product based economy. Lumber, pulp and paper and, more recently, biomass (wood products manufactured for fuel) continue to be the dominant agricultural products in our region. A turn towards more self-sustaining forestry in recent years has greatly improved the practices of timber harvesting. Woodland is not only managed for timber harvest but also for recreational uses, wildlife conservation, and water resource protection purposes.

There has been a recent increase in acreage of agricultural forest land in the county producing products such as Christmas trees, maple products and short-term woody crops. Income from these operations increased by 40% between 2002 and 2007, in part due to increased demand for woody biomass for heating fuel (wood pellets), a demand which is growing every year.

Critical Current and Future Issues

- The role of forestry and forest stewardship in water resource protection has come to the forefront in Oxford County.
- Erosion issues due to improper forest management techniques, temporary roadways, etc.

Opportunities for NRCS and SWCD Involvement for the next 5 years

- The Maine Forest Service is currently focusing attention on the Crooked River Watershed in Oxford and Cumberland Counties making efforts to encourage property owners in that watershed to develop Forest Stewardship management plans in order to help protect the upper

reaches of the Sebago Lake watershed, which is the drinking water supply for the City of Portland.

- The Maine Forest Service is also performing BMP Assessments on all timber harvests in the Crooked River Watershed in order to assure proper erosion control practices which help protect overall water quality. The Oxford County SWCD is currently assisting the MFS in this effort.
- Promote the development of forest management plans and forest practices implementation through District and NRCS programs.

Wildlife Habitat (Terrestrial and Aquatic)

Overview of landscape

The availability of abundant forest land, rivers, ponds, lakes, and streams is critical for high quality wildlife habitat. Because Oxford County is rich in forest habitat, upland wildlife species such as deer, moose, and bear are common to abundant. Waterfowl, such as ducks and geese, as well as wading birds like herons, rely heavily on the existence of wetlands as feeding, breeding and migratory resting areas. Song birds and game birds need forest, field, and wetland habitats that provide a variety of food, water, shelter and nesting needs. Amphibians such as salamanders, toads and frogs have specialized needs for breeding, which include both clean water and connective habitat for certain species to get to breeding areas like vernal pools. Good water quality and connective habitat is also vital for migratory species of fish

Critical Current and Future Issues

- Degradation of habitat: forest fragmentation, sedimentation of spawning areas and wetlands. “Loss of habitat” is the root issue when it comes to wildlife. Development, although not rapid or strong in Oxford County compared to other parts of Maine, proceeds steadily and with less regard to the needs of wildlife largely due to the perception that there is no pressing shortage of either wildlife or habitat. Wetlands which are particularly sensitive to development and frequently degraded or lost as a result, have long been identified as being among the most critical habitat to wildlife, with vernal pools being one of the most vulnerable.
- Urban/suburban displacement. The habitat needs for wildlife are increasingly overlapping with human residential habitat. Wildlife is everywhere. It is not uncommon to encounter deer crossing fields and road ways. Moose, though less common, are frequently seen wading in lakes and ponds, even strolling through small towns. The population of wild turkeys has exploded since efforts were made to re-establish their numbers several decades ago. Fox, raccoon and coyote are increasingly becoming visitors to populated residential areas. As much as people enjoy watching wildlife there are times and places that certain wildlife are becoming “nuisances”.

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- Many wildlife species move from one type of habitat to another during different times of year. Deer, for example, need foraging habitat as well as protective wintering habitat. Fragmentation of deer habitat due to development, road building, and forestry operations, force deer to utilize less suitable areas that offer less food and protection. Others become confined within areas that they soon overpopulate. Deer wintering areas.
 - Migratory fish, such as salmon and trout, are especially vulnerable when it comes to changes in their ability to move within their habitat. Without efforts to protect and /or restore migratory fish passage some species are at risk of endangerment due to inability to reach their breeding and rearing areas. This has become an issue that has gained recognition in recent years.

Opportunities for NRCS and SWCD Involvement for the next 5 years

- Efforts are being made by environmental groups and state agencies to determine the scope and severity of migratory fish passage problems and to identify solutions to improve and enhance fish passage. The Casco Bay Estuary Project and the Androscoggin River Watershed Council have been doing grant-funded fish passage culvert surveys to identify and document problem areas in the upper Presumpscot and Androscoggin Watersheds. Improved standards for culvert replacement by the Maine DOT will hopefully add to the success of this effort.
- Use fish passage surveys to prioritize potential fish passage projects and address these needs through partnerships with fisheries agencies, NRCS and Conservation Districts.
- Develop workshops educating landowners, builders, developers, regarding development of land with priority on preservation of buffers along waterways and contiguous wildlife corridors allowing for freer movement of wildlife in and around developed areas.

Urban Landscape

Overview of landscape

Urban development along the Counties major transportation corridors is increasing, causing major shifts in land use. On the horizon: The Oxford Casino and the influx of development on its coattails.

Critical Current and Future Issues

- Displacement of agriculture
- Urban/suburban sprawl
- Waterfront development
- Impervious surfaces- storm water runoff- nonpoint source pollution

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- Septic tank issues – water quality, ground water
 - Landfills, leaking underground storage tanks, recycling, energy, infrastructure

Opportunities for NRCS and SWCD Involvement for the next 5 years

- Storm water issues should be planned for. Localities should be encouraged to develop stormwater management plans before they become regulated and absolutely necessary. Low impact development strategies should be incorporated at the planning and development stage. Districts need to increase staff training and knowledge and be available to provide technical assistance when necessary.
- Develop ordinances requiring a minimum vegetated buffer when developing along waterfront. Continue public education programs to educate waterfront landowners, and real estate personnel on the regulations of waterfront development.
- Develop a septic tank pump out program, including property owner education on septic system maintenance.

Hay/Pasture Landscape

Overview of landscape

In Oxford County hay land and pasture are the dominant agricultural land uses with over 10,479 acres.

Critical Current and Future Issues

Surface water quality (grazing). Unrestricted grazing has created water quality problems where animals have access to streams and rivers. Animal waste and bank erosion from grazing contributes to non-point source pollution.

- **Plant and soil quality. Productivity and quality.** Plant and soil quality is affected by a lack of management of hay and pasture lands. Liming and fertilizing is often required to enhance soil quality, but these practices are not cost-effective without USDA support. Land owners need incentives to better manage their property for hay production.
- **Agricultural land conversion to house lots.** Development pressures have resulted in valuable hay and pasture land being converted to residential use. Once converted to development, land is unlikely to ever be available for production of crops or hay.

Opportunities for NRCS and SWCD Involvement for the next 5 years

- **Education on better pasture and hay land management.** Opportunities exist for pasture management field days/seminars where producers are encouraged to **increase production and quality of product** through application of proper amounts of lime and fertilizer. Increased

quality of product may open up more lucrative markets thereby offsetting cost of proper land care. Weed identification is also important so producers know the appropriate herbicides to apply. Workshops on rotational grazing need to be provided to livestock producers.

- **Agricultural conservation programs.** Educate producers on the available cost share options for fertilization, seeding, liming, etc. through NRCS. Districts need to be proactive and effective in the education portion of these programs.
- **Environmental Quality Incentive Program (EQIP) practices:**
 - Provide funding to assist with fencing livestock out of streams and creating alternative grazing areas so rotational grazing is most productive.
 - Stream crossings will have to be provided to allow livestock access to pasture areas divided by waterways.
 - Providing funding and education on reinforced animal trails and walkways will lessen the erosion created by habitual use of trails.
 - Watering facilities will have to be provided once livestock are fenced from streams. These could include free standing troughs and waterers, or designated access to the stream at a reinforced watering area.
 - Pipeline will have to be provided from wells/water sources to any manmade watering facilities/ troughs.
 - Prescribed grazing will allow the rotation of livestock to allow land to “rest” and recover from severe weather or overgrazing. Ultimately, rotational grazing will provide the healthiest pastures, lessening erosion and increasing livestock health as well as pasture health.

Irrigated/Non-Irrigated Crop Landscape

Overview of landscape

Harvested croplands consist of only about 5% of the land use in the county. The productivity of these lands per acre is among the best in the state, with hay and corn among the leading crops producing an average net income of \$ 207/acre in crop value. Of all the agricultural lands in Oxford County only 3% use irrigation.

Critical Current and Future Issues

Ground water quality/Aquifer protection. Ground water quality can be affected by excess applications of fertilizers and pesticides. Producers should be encouraged to improve management

of chemical applications, utilize soil testing for comprehensive nutrient management, and develop alternatives to chemical fertilizer and pesticide application.

- **Surface water quality.** Surface waters are affected by nonpoint source pollution from a variety of land uses. Stormwater runoff affects waterways by injecting a multitude of pollutants directly into waterways, affecting fish habitat. Atlantic salmon could be particularly affected, as much of the state's population lives in landlocked water bodies where pollutants are slow to escape or dissipate.
- **Soil/Land Erosion.** Erosion from crop lands wastes valuable soil resources and impacts surface water quality and fish habitat. Conservation practices such as crop rotation, cover crops, reduced tillage and/or grass waterways are needed on croplands

Opportunities for NRCS and SWCD Involvement for the next 5 years

- **Pesticide education.** In an effort to lessen the effects of inappropriate pesticide application in agricultural and urban settings, increased training needs to be provided to both large-scale and small-scale producers, business owners and homeowners. Training and implementation programs in integrated pest management should also be considered, thereby lessening the desire for pesticide use and increasing the understanding of ecological systems and natural alternatives to pesticide application for pest and disease control.
- **Environmental Quality Inceptive Program (EQIP) practices:**
 - Integrated Pest Management
 - Nutrient Management
 - Access Road
 - Stream Crossing
 - Crop Rotation
 - Cover Crops
 - Buffer Strips

Headquarters/Farmstead/Concentrated Livestock Areas

Overview of landscape

Farmsteads are the high activity, control centers of all farm operations. They are the areas that receive the most traffic and overall human impact. The farmstead is more often than not the farmer's home as well as a focal point for all farming business activities. Fuels for farm equipment are stored sometimes in large aboveground tanks. Feed for livestock, silage, fertilizers and pesticides are stored here in barns, silos and sheds. Animal waste is often accumulated in large amounts adjacent to poultry, beef and dairy operations. These are areas where the highest amounts of energy resources are used and much of the time the central water source for the entire farm operation is also located here.

As large farms in Oxford County have been slowly broken down into smaller farms, the number of farmsteads has been increasing according to the 2007 Ag Census.

Critical Current and Future Issues

Concentration of animals in winter causes overuse of small areas of pasture or paddocks. This overuse causes damage or complete removal of ground cover such as grasses.

- Surface water quality is affected from intense concentrations of animal manures and the loss of soil groundcovers, causing sediment runoff and increased land erosion.
- Ground water quality is affected through infiltration of concentrated animal manures through the bare soils and sediment runoff.
- Polluted wells can occur from infiltration of concentrated animal manures and sediment release.

Opportunities for NRCS and SWCD Involvement for the next 5 years

- **Animal waste management education.** Host workshops and publications for producers with the potential for concentrated animal areas. Through these efforts, help make landowners aware of the potential for animal wastes to create problems with surface and ground water quality, including potential effects on wells.
- Promote the development and implementation of certified nutrient management plans through workshops, one-on-one visits with producers, and by other means, especially in areas of high livestock concentration. Nutrient management plans should be comprehensive, including the entire farm area, not just specific fields or pastures. Producer goals must be identified and worked toward in a strong partnership, encouraging progress and maintenance of BMPs.

Stakeholder Input

Process: (public meeting)(survey)

We began our assessment with a simple survey of the general public at the Fryeburg Fair in which we asked people to write their county of residence on 3 slips of paper and vote for their greatest resource area of concern by depositing the slips in to jugs labeled with Landscape resource concern areas (Cropland, Pasture/Hay land, Forest, Water, Urban, etc.). We also did this same kind of survey at the Maine Municipal Assoc. conference in order to get input from town officials throughout Maine. The results were weighted heavily toward Water resource issues, water quality in particular being of the greatest concern. Below are the tabulated results of the public forum and the surveys outlining the most important concerns of the stakeholders.

Summary of input:

Item #	Category	Description and Specific Location (Quantify where possible)
Non-irrigated Cropland		
1	Other	Urban development-subdivisions using cropland****
2	Other	CSA's/ direct marketing/Farmer's Market-leading to demand for more food/sustainability*****
3	Water Quality- Excessive levels of Pesticides/Organics in Surface Water/Groundwater	Pesticide/Fertilizer Use *
Irrigated Cropland		
4	Water Quantity-Insufficient Water Use on Irrigated Land	Water taking/extraction rights*
5	Other	CSA's/ direct marketing/Farmer's Market-leading to demand for more food/sustainability****
6	Soil Condition-Organic Matter Depletion	Soil Fertility*
Hayland/Pasture		
7	Soil Condition	Managing for soil fertility***
8	Other	Development pressure*
9	Other	Property taxes***
Forest		
10	Plant Condition-Noxious and Invasive	Invasive insects/plants***** Diseases-Maple fungus**
11	Plant Condition-Productivity, Health, Vigor	Consequences of poor management leading to undesirable/weed species*
12	Soil Condition-Erosion Water Quality-Excessive suspended sediment and turbidity in surface water	Timber Harvest Planning-Best Management Practices followed to prevent erosion****

Headquarters/Farmsteads/Concentrated Livestock Areas		
13	Water Quality-Groundwater	Pesticide storage-manure storage- fuel storage*
14	Water Quality- Excessive Nutrients in Surface Water	Livestock in streams*
15	Domestic Animals- Inadequate Quantities of Feed and Forage	Hobby farmers using small lots for Ag purposes/ too many animals for what the land can support*
Wildlife Habitat (Terrestrial and Aquatic)		
16	Fish and Wildlife- Inadequate Space/Habitat Fragmentation	Wildlife corridors/passages/migration*
17	Fish and Wildlife- Inadequate Water/Space	Sensitive habitat (wetland) restoration*
18	Fish and Wildlife- Inadequate Cover/Shelter	Deforestation**-Stratification in forest +/-*
19	Fish and Wildlife-Imbalance Among and within Populations	Active management vs. passive management*** Threatened and endangered species management*
Urban		
20	Other	Failure to address development/sprawl*****
21	Soil Erosion-Classic Gully	Channelization of roadside ditches- -impacts on Ag and Forest land**
22	Water Quantity-Excessive Runoff	Stormwater runoff***
Water		
23	Water Quantity-Aquifer Overdraft Water Quality-Groundwater	Aquifer- needs to be protected from contamination ***** Water extraction/depletion****
24	Plant Condition-Noxious or Invasive	Invasive aquatic plants/invasive wildlife*****
25	Water Quality-Excessive suspended sediment and turbidity in surface water	Lake Water Quality***** Streams/Rivers-Many of the same concerns as lakes/aquifers*****
Other (Define)		
26	Other	Lack of civic engagement**
27	Other	Proposals to weaken regulatory policies/laws****
28	Other	Alternative energy*