**Natural Resource Management** (NRM) refers to the management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations . Natural resource management deals with managing the way in which people and natural landscapes interact. It brings together land use planning, water management, biodiversity conservation, and the future sustainability of industries like agriculture, mining, tourism, fisheries and forestry. It recognizes that people and their livelihoods rely on the health and productivity of our landscapes, and their actions as stewards of the land play a critical role in maintaining this health and productivity. Therefore ,Natural resource management specifically focuses on a scientific and technical understanding of resources and ecology and the life-supporting capacity of those resources. Because Natural resource management issues are inherently complex. They involve the ecological cycles, hydrological cycles, climate, animals, plants and geography, etc. All these are dynamic and inter-related. A change in one of them may have far reaching and/or long term impacts which may even be irreversible.In addition to the natural systems, natural resource management also has to manage various stakeholders and their interests, policies, politics, geographical boundaries, economic implications and the list goes on. It is a very difficult to satisfy all aspects at the same time. This results in conflicting situations.

The various approaches applied to natural resource management include:

* Top-down (command and control)
* Community-based natural resource management
* [Adaptive](https://en.wikipedia.org/wiki/Adaptive) management
* Precautionary approach
* Integrated natural resource management

But role of stakeholders cannot be ignored in natural resource management

**Stakeholder in NRM**

Stakeholder is referred to as ‘‘...any individual, group and institution who would potentially be affected, whether positively or negatively, by a specified event, process or change.’’

**Stakeholder analysis requires**

1.Clarify objectives of the stakeholder analysis

2. Identify and categories the stakeholders that may have influence

3.Place issues in a systems context to develop natural resource

4.Investigate stakeholder interests and agendas

5.Investigate patterns of inter-action and dependence (e.g. conflicts and compatibilities, trade-offs and synergies)

**1.Community-Based Natural Resource Management(**CBNRM)

The community-based natural resource management (CBNRM) approach combines conservation objectives with the generation of economic benefits for rural communities. The three key assumptions being that:

* locals are better placed to conserve natural resources,
* people will conserve a resource only if benefits exceed the costs of conservation,
* people will conserve a resource that is linked directly to their quality of life.

because when a local people's quality of life is enhanced, their efforts and commitment to ensure the future well-being of the resource are also enhanced.

Regional and community based natural resource management is also based on the principle of [**subsidiarity**](https://en.wikipedia.org/wiki/Subsidiarity)( which means that …………………………

A **problem** of CBNRM is the difficulty of reconciling and harmonising the objectives of socioeconomic development, biodiversity protection and sustainable resource utilisation.because the concept and conflicting interests of CBNRM, show how the motives behind the participation are differentiated as either people-centred (active or participatory results that are truly empowering) or planner-centred (nominal and results in passive recipients). Understanding power relations is crucial to the success of community based NRM. Locals may be reluctant to challenge government recommendations for fear of losing promised benefits.

CBNRM is based particularly on advocacy by nongovernmental organizations working with local groups and communities, on the one hand, and national and transnational organizations, on the other, to build and extend new versions of environmental and social advocacy that link social justice and environmental management agendas with both direct and indirect benefits observed including a share of revenues, employment, diversification of livelihoods and increased pride and identity.Furthermore Governance is seen as a key consideration for delivering community-based or regional natural resource management

**2. Adaptive Management Approach**

This methodological approach includes recognition that adaption occurs through a process of ‘**plan-do-review-act’**. It also recognises seven key components that should be considered for quality natural resource management practice:

* Determination of scale of problem
* Collection of baseline data and use of indigenous knowledge
* Delivering [Information to concerned group/authorities](https://en.wikipedia.org/wiki/Information_management)
* Monitoring and evaluation of NRM plan
* [Risk management](https://en.wikipedia.org/wiki/Risk_management)
* [Community engagement](https://en.wikipedia.org/wiki/Community_engagement)
* Opportunities for [collaboration](https://en.wikipedia.org/wiki/Collaboration)

**3.Integrated Natural Resource Management**

Integrated natural resource management (INRM) is a process of managing natural resources in a systematic way, which includes multiple aspects of natural resource use (biophysical, socio-political, and economic) meet production goals of producers and other direct users (e.g., food security, profitability, risk aversion) as well as goals of the wider community (e.g., poverty alleviation, welfare of future generations, environmental conservation).

It focuses on sustainability and at the same time tries to incorporate all possible stakeholders from the planning level itself, reducing possible future conflicts. The conceptual basis of INRM has evolved in recent years through the convergence of research in diverse areas such as sustainable land use, participatory planning, integrated watershed management, and adaptive management. INRM is being used extensively and been successful in regional and community based natural management.

**4. Precautionary Biodiversity Management**

Biodiversity is "the variety of life" and relate to different kinds of "biodiversity organization". The "threats" wreaking havoc on biodiversity include; [habitat fragmentation](https://en.wikipedia.org/wiki/Habitat_fragmentation), putting a strain on the already stretched biological resources; forest deterioration and deforestation; the invasion of "alien species" and "climate change". Since these threats have received increasing attention from environmentalists and the public, the Precautionary Management Of Biodiversity becomes an important part of natural resources management.

According to Cooney, there are material measures to carry out precautionary management of biodiversity in natural resource management. Cooney claims that the policy making is dependent on "evidences", relating to "high standard of proof", to forbid special "activities" and "information and monitoring requirements". Before making the policy of precaution, categorical evidence is needed. When the potential threat of "activities" is regarded as a critical and "irreversible" endangerment, these "activities" should be forbidden. For example, since explosives and toxicants will have serious consequences to endanger human and natural environment, the South Africa Marine Living Resources Act promulgated a series of policies on completely forbidding to "catch fish" by using explosives and toxicants.

**Land Management**

In order to have a sustainable environment, understanding and using appropriate management strategies is important. In terms of understanding, Young emphasizes some important points of land management:

* Comprehending the processes of nature including ecosystem, water, soils
* Using appropriate and adapting management systems in local situations
* Cooperation between scientists who have knowledge and resources and local people who have knowledge and skills

Dale et al. (2000) study has shown that there are five fundamental and helpful ecological principles for the land manager and people who need them. The ecological principles relate to time, place, species, disturbance and the landscape and they interact in many ways. It is suggested that land managers could follow these guidelines:

* Examine impacts of local decisions in a regional context, and the effects on natural resources.
* Plan for long-term change and unexpected events.
* Preserve rare landscape elements and associated species.
* Avoid land uses that deplete natural resources.
* Retain large contiguous or connected areas that contain critical habitats.
* Minimize the introduction and spread of non-native species.
* Avoid or compensate for the effects of development on ecological processes.
* Implement land-use and land-management practices that are compatible with the natural potential of the area.

**What Is in a Natural Resource Management Plan?**

Natural resource management plan is a specific statement of the objectives that is followed by a series of activities in order to meet those objectives.

Without a plan, decisions may be made based on short-term conditions but with long-term, undesirable consequences. In essence, your plan is a "road map" to guide you from where you are to where you want to be.

A management plan does not have to be a complicated document and there is no standard format for writing one. It may vary from a simple description for timber management of one or more plantations to a very detailed multiple resource plan for participation in programs such as Forest Stewardship, Tree Farm, and even county tax assessment. No matter what the purpose or program, it is important that your plan include the following information:

1. Your objectives
2. Property location and history
3. Resource assessment
4. Management recommendations
5. Activity schedule
6. Supplemental information

**Your Objectives**

This is the most important part of the management plan because it is where you state exactly what you want out of your land. An objective is a desired outcome or future condition for your property. Your objectives should reflect your true desires and must be compatible with the resources available to you. It is therefore necessary to have some basic knowledge of the resources on your property before establishing your objectives.

An example statement of objectives for a property might be: *to obtain periodic revenue from timber production, while providing habitat for deer, turkey and some songbirds*. Based on this broad statement of desired outcomes and an assessment of your resources, discussed on the next page, more specific objectives can be outlined for each resource. Ideas to help you formulate your objectives are listed in the appendix at the end of this paper.

**Property Location and History**

Your management plan should include a description of your land as recorded in the legal deed for the property (in county records) as well as maps showing its location relative to land features and roads. For this it may be useful to outline your property on a US Geological Survey (USGS) topographical map. Your local surveyor's office (or even some bookstores) should have copies of local USGS maps. For more detail you can include a survey map showing the precise location of property corners and boundary lines. If a survey map is registered with the deed as a legal description of the property, a licensed surveyor must have completed the survey. A second set of maps that are useful for planning management activities should focus just on your property, and should identify roads, land or structural features, different forest or vegetation types, fence lines, and any other features that may influence or be part of your goal. Aerial photos of your property will significantly enhance any of these maps.

It is also helpful to document, as best you can, the management history of your property. Has it been cleared for agriculture? Have there been previous rotations of timber? Is there evidence of any other uses in the past? This information will give you some idea of your land's potential and may give you clues about what can be done with it.

**Resource Assessment**

This section contains descriptive information about the natural resources on your property. It may include information such as stand types (e.g., dominant species, ages, understory), other vegetation communities, soils, water bodies, historical features, wildlife uses, and recreational opportunities. The assessment is also used to help determine what the land is capable of producing in terms of timber and/or wildlife, and will help you to further clarify your objectives.

This information comes from an inventory that you or a natural resource professional conducts on your land. Generally, an inventory includes a portion, or sample, of a resource because it would usually take too much time and money to measure every plant or other feature on a property.The number of measurements needed to describe a forest depends on the variability within that forest. More data are needed on sites with a greater variety of plant and animal species than on those with only a few species.

One type of inventory is the timber cruise. A timber cruise is usually organized by stands in the form of stand and stock tables. A *stand table* lists the number of trees per acre according to species and tree diameter. *Stock tables* give volume information in board feet, cubic feet or cords per acre. See <https://edis.ifas.ufl.edu/fr131> for more about what to expect in a forest inventory. A consulting forester can conduct a timber cruise and interpret the data for you. See <http://edis.ifas.ufl.edu/fr125> for tips on selecting a consulting forester.

The resource assessment should also be used to determine if any regulatory constraints will apply to forest practices on the property. Consider potential erosion problems, wetlands or water bodies, and threatened or endangered species habitat. Addressing these up front through following Best Management Practices (BMPs) and, if necessary, cooperation with appropriate agencies will help you avoid problems or litigation in the future. Florida's silvicultural BMPs can be obtained from your county forester, or viewed on the web at <https://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/For-Landowners/Best-Management-Practices-BMPs>.

**Management Recommendations**

Based on the resource assessment and your specific objectives, recommendations can be made for the entire tract or individual areas. Recommendations should outline a general set of treatments or operations over a long term, with a discussion of the expected results of each management sequence. Those general recommendations should be supplemented with specific recommendations, which are usually designated for five to ten year blocks of time. Specific recommendations may include the forest regeneration method(s) to use, where to plant wildlife food plots, when and where to burn, which areas to harvest, and the BMPs that apply to each practice.

Harvesting is a common management tool used to alter the species composition, density, and age of forest stands. Both plants and animals will respond to the changes that take place in a stand following a cut. A forester or other resource professional can help you to decide which cutting practices are appropriate for achieving your desired outcomes, and will recommend a silvicultural prescription for each stand.

**Activity Schedule**

An activity schedule lists when each recommended treatment will take place. It may also include projected costs and revenues for each operation. As management activities take place on your property, a continuous record should be kept of the dates, times, places, expenses, and income associated with each activity. This record will be helpful for reporting the costs and revenues associated with your management activities for tax purposes. Records should also include details about the specific activities, such as types of seedlings or herbicides, weather conditions, contractors and results of follow-up monitoring. These records will be a great help in the future as you evaluate your successes, plan additional activities and update the management plan.

**Supplemental Information**

Appendices provide other types of information and can be included at the end of the plan.You may wish to include an overall financial summary that describes the costs and revenues mentioned in the Activity Schedule section. Extension or research publications containing information relating to specific practices in your plan can also be included as an appendix. Another useful appendix would be a list of contacts in case you need further assistance.

Contacts to include would be your county or consulting forester, wildlife biologist or consultant, county extension agent, regulatory agencies, financial advisors, attorneys, or anyone else that might be of assistance to you.

**The New Landscape Management Plan**

In the Florida Panhandle region, a Landscape Management Plan (LMP) has been developed in order to streamline the plan preparation process as well as certification in programs like the Forest Stewardship and Tree Farm Programs. The LMP is a suite of silvicultural practices available across different forest types, guided by the landscape and landowner objectives in a region. The LMP content is designed to be a resource for both foresters and landowners. This approach emphasizes the forester or natural resource professional as a more important resource than the plan itself. For the forester, the landowner’s individual objectives and plan is viewed within the context of the landscape. Each recommendation connects back to the identified goals and objectives of the LMP. This oftentimes already happens at the property level, but the LMP clearly defines opportunities at a landscape level and provides foresters guidance and reference for recommendations. For landowners in the Panhandle region of Florida, your Florida Forest Service county forester can help you get a plan connected to the regional LMP. Find your county forester at <http://www.freshfromflorida.com/CountyForester>. A LMP for the eastern and central regions of Florida is now under development.

**Conclusion**

The information in your management plan should be simple, but with enough detail to be useful. Since a management plan is flexible your objectives and resource conditions can be periodically reconsidered. Most management plans are designed to be reviewed every five to ten years, with adjustments made to accommodate the continually changing environment (from fire and bugs to landowner objectives) that is part of natural resource management.

Consider getting a natural resource professional to inventory your forest and develop your plan. Most consultants base their fees on the size of the property involved, either as a per-acre fee or a fixed fee per minimum acreage (usually 50–100 acres). Others charge hourly rates. Florida Forest Service county foresters can write your management plan at no cost for properties 160 acres or less in size, but they do not conduct inventories. Most county foresters keep a list of consultants in their area. Find your county forester at <http://www.freshfromflorida.com/CountyForester>. You can also find consulting foresters and other businesses and services using the Florida Forest Service’s Vendor Database at <http://tlhfor013.doacs.state.fl.us/fsvd/>.

**Appendix—Establishing Your Objectives**

If you do not yet have specific objectives for your land, here are some questions to help you get started. Your answers to these questions will help you determine the things on which you may want to focus as you develop your management plan.

* What is your property used for? (primary residence, weekend retreat, agriculture, recreation, timber investment, future development, other)
* How many acres in forest? In crops or pasture? Other uses? Total?
* What are your priorities? (timber management, wildlife management, recreation/aesthetics, water protection, soil conservation, other)
* What types of recreational activities do you enjoy on your land? (bird watching, biking, hiking, firewood, fishing, hunting, camping, horseback riding, boating, nature walks, wildlife observation, other)
* What are your timber management goals? (generate immediate income, generate periodic income, maintain forest health, improve future income potential, maintain mature forest, other)
* What are your wildlife management goals? (recreational hunting opportunities, non-game species, protection, observation, other)
* What wildlife species would you like to feature on your land? (white-tailed deer, fox, squirrel, bear, raccoon, rabbit, beaver, quail, waterfowl, songbirds, birds of prey, wild turkey, mourning dove, other game or non-game species)
* What is your soil and water management focus? (stabilize existing erosion, improve water quality, increase soil productivity, other)
* What are your management constraints? (limited capital, lack of equipment, distance from property, need financial assistance, need technical assistance, other)
* What is the management history of your property?
* Are there outstanding or unique features requiring special protection or management?
* What is your overall management philosophy?
* What is your ownership/family situation?