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A Brief History of the Natural Areas Movement

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In celebration of the Natural Areas Association's 50 years of supporting practitioners who conserve and steward natural areas across North America, we offer the following brief history of the natural areas movement. This is excerpted from a recent report of NAA's Science Advisory Committee submitted to the NAA Board of Directors titled, Natural Areas in the Twenty-first Century (August 2022). This full report will be published in upcoming months.

The purpose of this brief summary is to remember the effort's long and relevant history that allowed us to be where we are today. In a time when the challenges are great and the work seemingly overwhelming, we thought it might be nice to look back and reflect on the impact of those who began this work so many years ago. We hope that this brief history will be a useful tool to educate others about the value of natural areas, and that it will support your efforts to advocate for the special places you steward.

We understand that this is a very brief history of the movement and that there are many other stories to tell. If you have additional content related to the history of the natural areas movement to offer, please submit to Lisa Smith, lsmith@naturalareas.org.

The concept of natural areas, as well as the establishment of formal programs for the identification, protection, and stewardship of such areas, is one of several contributions to nature conservation that developed largely in North America, albeit with European antecedents extending back at least to Alexander von Humboldt (Wulf 2015). The world has changed considerably since the natural areas movement began in the early 20th century, as has our understanding of what the future might bring in terms of changed climate and other environmental conditions.

Natural areas conservation on a broad scale in North America began with the Committee on the Preservation of Natural Conditions of the Ecological Society of America (ESA), founded in 1917 and chaired by Victor E. Shelford (Figure 1), who was the founding president of the ESA. "It is a committee on the preservation of nature. Its efforts are directed toward the preservation of natural areas with original flora and fauna (or as nearly so as may obtain) and the maintenance of the natural biotic balance in existing preserves" (Shelford 1926). The overarching charge of this committee was to list all preserved and preservable areas in North America in which natural conditions persisted and to promote their preservation.

Shelford's committee drew up maps of the United States and Canada and, starting with national parks, identified large areas representative of major ecosystem types. Parks were often proposed for expansion and buffer zones were drawn to surround them. New protected areas were proposed for ecosystems, such as the tallgrass prairie, for which no large parks yet existed (Aldo Leopold Archives n.d.). Thus began the natural areas movement (Fell 1983).

The goal of Shelford and colleagues was to preserve a full array of ecosystem types, in as pristine condition as possible, for scientific study. Natural areas were described as "living museums" for research and education. They were recognized by the presence of native vegetation and associated species as well as the relative absence of anthropogenic stressors. As a start, the Preservation Committee called for protection of "an undisturbed area in every national park and public forest." This goal quickly expanded into a more visionary resolution to establish "a nature sanctuary with its original wild animals for each biotic formation," which was proposed by the Preservation Committee and accepted by the ESA Governing Board in 1931 (Croker 1991). This is an early example of the ecosystem representation goal, now a central feature of systematic conservation planning worldwide (Noss and Cooperrider 1994; Margules and Pressey 2000; Groves 2003; Kukkala and Moilanen 2013).

Government agencies in the United States quickly became involved in the natural areas movement. Initially the US Forest Service did not differentiate between wilderness, primitive, and natural areas. In 1924, at Aldo Leopold's urging, the Gila Wilderness in the Gila National Forest of New Mexico became the world's first designated wilderness area. In 1927 a 4100-acre ponderosa pine forest in Arizona was withdrawn from timber or forage production and became the first natural area—the Santa Catalina Research Natural Area—set aside primarily for scientific study (Moir 1972).

In Canada, where responsibilities for natural resources and public lands lie primarily with the provinces, natural areas protection began with a declaration, "Sanctuaries and the Preservation of Wild Life," issued by the Federation of Ontario Naturalists and seconded by the Royal Canadian Institute in 1934 (Federation of Ontario Naturalists 1934). This built on the Statement of the Ecological Society of America on Sanctuaries and Reserves, and stated, "in most civilized countries today sanctuaries are being set aside for the preservation of



Figure 1.—Victor Shelford leading a field trip at Reelfoot Lake, Tennessee, in 1937. Photo by Eugene Odum. From Croker (1991).

representative samples of the natural conditions characteristic of those countries.” World War II intervened, but in 1942 six organizations convened a conference to discuss Conservation and Post-War Rehabilitation, which reinforced the role of conservation areas as critical elements of watershed conservation planning under Conservation Authorities (Guelph Conference 1942).

A park agency was established in Ontario in 1954, which in 1965 became a participant in the International Biological Programme (IBP), a volunteer effort to document natural areas for possible regulation as ecological reserves (Taschereau 1984). In Ontario the IBP was institutionalized within the province’s parks agency, which conducted systemic ecodistrict and ecoregional studies. This resulted in documentation of “significant natural areas,” of which many were regulated as Provincial Nature Reserves (Zones). More than 500 of those occurring on private lands were extended protections through land-use controls, property-tax relief, and private land stewardship as “Areas of Natural and Scientific Interest.” Simultaneously, regional surveys of Environmentally Sensitive Areas focused efforts on natural areas conservation at local scales (Eagles 1984). Land trusts have focused on securing development rights and

stewardship authority on such natural areas. An example is the Nature Conservancy of Canada, whose mission is to protect “areas of natural diversity for their intrinsic value and for the benefit of our children and those after them” (Freedman 2013). As a result, the concept of natural areas was firmly embedded in conservation planning and practice in Ontario and other Canadian provinces.

Protective zoning within Canada’s national parks is not legally required but is a policy that has been confirmed by Parliament. Protective zoning first occurred in 1961 in Point Pelee National Park. Nationally a five-zone system was adopted in 1967. The zones “I. Special Preservation” and “II. Wilderness” together “make the greatest contribution towards the conservation of ecological integrity” by maintaining “a condition that is determined to be characteristic of its natural region” (Parks Canada 2017). On a provincial level, Ontario Parks also first adopted park classes (and zones) in 1967. Its protective zones were Primitive (later Wilderness), Wild River (later Waterway), and Nature Reserve. The goal of Primitive (Wilderness) parks (or zones) was “representative areas of natural landscapes for posterity and ... for wilderness recreation activities and for educational and scientific use.” This protective zoning recognized “the psychological need, of many people, to know that unspoiled wilderness areas exist” (Killan 1993). A Nature Reserve park (or zone) was required “to represent and protect the distinctive natural habitats and landforms of the province ... for educational and research purposes.” Despite institutional challenges in delivery, the foundations were well established in Ontario and elsewhere in Canada for appropriately recognizing and stewarding significant natural areas within parks. In Ontario almost all types of natural areas are treated in land-use planning as components of “natural heritage systems” (Riley and Mohr 1994).

The relative vagueness of the term “natural area” was noted early on in North America. As the eminent ecologist Stanley Cain suggested, “I am wholly in agreement with Edward H. Graham (1944), who says that the term ‘natural area’ is a very useful and realistic one although incapable of exact definition. One virtue of the term is its very indefiniteness. Like the general term ‘community,’ it does not commit one to the necessity of certain difficult decisions; but it is an even broader term than community, suggesting a recognition of the simultaneous action of all operative factors and the joint existence of such diverse phenomena as organisms and different physical states of the atmosphere, soil, etc. *A natural area, then, is a geographic unit of any order of size with sufficient common characteristics of various sorts to be of some practical usefulness in biogeography*” (Cain 1947, italics in the original).

The Society of American Foresters (SAF) established a Committee on Natural Areas on 5 February 1947, intended “to inventory known natural areas of the nation” and defined natural area as “an area set aside to preserve permanently in unmodified condition a representative unit of the virgin growth of a major forest type primarily for the purposes of science, research, and education. Timber cutting and grazing are prohibited, and general public use discouraged” (Shanklin 1968). The SAF approach was very forest-centric and ignored non-forest ecosystems such as grasslands and shrublands. The

importance of natural areas to the forestry profession was stated succinctly by Franklin and Trappe (1968): “Silviculture is based on concepts of plant succession and climax ... Natural stands in various successional stages provide a key for development of sound silvicultural practices.” According to Moir (1972), “until recently, the (SAF) committee based its evaluation of what natural areas were needed upon concepts of forest cover types, which emphasized dominant timber growth and not necessarily the total assemblage of plants and animals. This conceptual difference between foresters and ecologists often produced difficulties in establishing natural areas.”

In May 1966 the US Forest Service Manual provided that the service “will cooperate with other public agencies and professional organizations such as The Nature Conservancy, Society of American Foresters, American Society of Range Management, and Ecological Society of America to establish and maintain an adequate number and variety of research natural areas” (RNAs; Forest Service Manual 1966). A joint statement in 1968 by the secretaries of Agriculture and Interior in the Johnson Administration noted that “research natural areas are important as baselines against which man-caused changes can be measured” (cited in Moir 1972). In the same year, the Federal Committee on Research Natural Areas listed 336 RNAs on federal lands in the U.S., almost all of them on the national forests (Franklin et al. 1972).

The multi-agency Federal Committee on RNAs persisted through the 1970s and was housed in the Council on Environmental Quality, which broadened perspectives on natural areas. It defined RNAs as follows: “A Research Natural Area consists of a naturally occurring physical or biological unit where natural conditions are maintained insofar as possible” (cited in Franklin et al. 1972). Importantly, the Committee noted that deliberate manipulation, such as prescribed burning and grazing, should be allowed on RNAs and “may be necessary to maintain desired communities or organisms.” The committee also noted that RNAs ideally should be “sufficiently large to protect the features of interest from significant unnatural influences” (Franklin et al. 1972). Thus, many key concepts of modern protected area design and management were present in that formulation of RNAs.

Establishment of state natural areas programs in the middle to late 20th century was a consequential development in the natural areas movement in the U.S. This began in the Midwest in 1948 where, at the urging of George Fell, the Chief of the Illinois Natural History Survey, Harlow Mills presented a report to the Illinois State Academy of Science on remnant natural areas. The report stated that “there may be areas in the state, very distinct for some reason, but too small for inclusion in the State Park System as now visualized. These areas may well deserve public ownership and protection in the public interest” (cited in Pearson 2017). Fell quickly provided Mills a brief report describing several such natural areas in Illinois. Fell held a “conviction from the outset that the preservation of remnant natural areas required more than just buying the few odd parcels that might become available; what was required was a comprehensive strategic approach in selection, stewardship, and administration” (Pearson 2017).

Characteristically ahead of his time, in 1948 Fell had written a resolution, which was passed by the Illinois State Academy of Science, to establish a statewide system of nature preserves. The state of Illinois established this system in 1963 and amended it in 1965. The Illinois Nature Preserves System Act defines a natural area as any area retaining “to some degree its primeval character” or has “unusual flora, fauna, geological, or archaeological features of scientific or educational value” and is set aside “for scientific research, education, esthetic enjoyment and providing habitat for plant and animal species and communities and other natural objects” (Moir 1972).

On a more pessimistic note, the governing board of the Ecological Society of America abolished Shelford’s Committee on the Preservation of Natural Conditions and his related Committee on the Study of Plant and Animal Communities in 1946 due to concerns about their preservation advocacy. Disappointed but undeterred, Shelford and his colleagues organized an independent group, the Ecologists’ Union, to continue the work of the former ESA committees (Croker 1991). A joint report by the Ecologists’ Union and the ESA’s Committee on the Study of Plant and Animal Communities was published in *The Living Wilderness* (the journal of The Wilderness Society) in the winter of 1950–51. This report, a sequel to Shelford’s *Naturalist’s Guide to the Americas* (1926), documented that no protected areas large enough to contain all native animal species in self-maintaining populations existed for deciduous forests, prairies, or lower elevations of the Rocky Mountains in the U.S. and Canada. Nevertheless, opportunities to create such sanctuaries still remained in some southern swamps, deserts, higher elevations in western mountains, boreal forests, and tundra (Kendeigh et al. 1950–51). In 1963 the American Association for the Advancement of Science published results of the most comprehensive study of natural areas in the United States to that date (i.e., an update to Shelford [1926] and Kendeigh et al. [1950–51]). The report advocated an enlarged and better coordinated natural areas program and listed 2400 scientific papers based on research within natural areas (AAAS 1963).

In 1950 the Ecologists’ Union was reorganized and renamed The Nature Conservancy. This initially small organization was led by Stanley Cain (president), George B. Fell (vice-president), and Joseph Hickey (secretary-treasurer) (Croker 1991). Beginning with the spirited and uncompromising leadership of George Fell as its unpaid director, The Nature Conservancy (TNC) ultimately became one of the largest and most successful land conservation organizations in the world. Its first stated purpose was “to preserve or aid in the preservation of all types of wild nature including natural areas, features, objects, flora and fauna and biotic communities” (Pearson 2017). In 1974 Robert E. Jenkins (TNC’s Vice-President for Science) developed the basis of the natural heritage methodology and established the first state natural heritage program in South Carolina (Jenkins 1985). The field inventory and database development activities of the state (and in Canada, provincial) natural heritage programs (called conservation data centres [CDCs] in Canada) led to significant advances in the process of identifying and prioritizing natural areas for protection.

Despite its appealing logic, the natural heritage program methodology developed by Jenkins posed a challenge to the prevailing and more informal and opportunistic method of selecting sites (natural areas) for preservation based on their perceived naturalness and scientific values. Sites—typically those that appeared to be undisturbed—were no longer the primary focus of inventory or protection. Rather, the focus was now on “elements of diversity” (specifically “elements of natural biological and ecological diversity”), especially rare species and both rare and representative natural communities. As described by Jenkins (1985), “The Conservancy reversed the virtually universal procedure of inventorying sites for their natural values ... By systematically listing, classifying, and characterizing the elements rather than the natural areas where they occur, the inventories can determine relative endangerment, track down the finest occurrence on the landscape, and identify conservation priorities in the state.”

In practice, however, sites were still evaluated by the natural heritage programs. For example, a “survey site” was the location where botanists, zoologists, and ecologists documented what was present. But now potential conservation sites could be identified using knowledge gathered about the location, extent, and condition of the element occurrences (EOs) they contained. Those identified sites might be further prioritized using this information along with knowledge of how rare or endangered the species or communities on the site were thought to be. Up through the 1990s, state offices of The Nature Conservancy commonly prioritized actions for the coming year using an annual “scorecard” of sites in need of conservation action. In the Forest Service, these ecological elements—often referred to as ecological “target elements”—were often represented by SAF or SRM (Society for Range Management) types during regional selection processes (Cheng 2004).

Also in 1974, when the first state natural heritage program was established, natural areas professionals began having annual workshops in the Midwest. At the fourth Midwest Natural Areas Workshop in Indiana in 1977, a proposal to form a Natural Areas Association (NAA) was discussed and a committee was appointed to explore the idea. The following year the committee reported back to the Midwest Natural Areas Workshop in Missouri, where participants voted to create the organization and elected officers and board members to develop bylaws. The bylaws were adopted, and the first full slate of officers and board members was elected at the 6th Midwest Natural Areas Workshop near Minneapolis in October 1979 (Iffrig 1981). The first issue of the *Journal of the Natural Areas Association* was published in January 1981 (Greg Iffrig, editor). By this time, membership in the NAA had expanded outside of the Midwest and included members from northeastern, southern, and western states, as well as Canada. The journal was renamed the *Natural Areas Journal* in 1982. By 1981 more than half of the U.S. states had natural areas programs as well as natural heritage programs (Iffrig 1981). The Natural Areas Association was recognized as the professional society for the staff of natural areas and heritage programs, with membership open “to those involved in the acquisition, preservation, or management of natural areas” (Iffrig 1981). In 1981 John Schwegman was President of the NAA, Richard Thom was Vice-President, and

George Fell was Secretary-Treasurer (this was apparently the original slate of officers).

Although we do not have space to discuss the issue in depth here, some tensions soon arose between TNC and some state natural heritage programs. In particular, there was some resistance among natural areas program staff to the natural heritage program methodology, especially its emphasis on inventory and protection of rare species. Some natural areas professionals saw the elements-of-diversity approach as a threat to their conventional site-based evaluations. Schwegman (1981), while he was president of NAA, wrote, “we must not forget that the roots of our movement lie with the science of ecology and the need to protect natural ecosystems which are so important to that field ... While I would be the last to deny the value of individual species conservation, I do believe it must be a subordinate part of a natural areas program.”

The last few decades have seen many changes and advancements in the way natural areas in North America are conceptualized, inventoried, designed, and managed. This modern history is too complex to describe in detail here, but it can be gleaned from the pages of the *Natural Areas Journal*, *Conservation Biology*, and other journals, as well as from such texts as Noss and Cooperrider (1994), Groves (2003), and Groves and Game (2015) and the literature of systematic conservation planning (e.g., Margules and Pressey 2000). Concepts of landscape ecology (Forman and Godron 1981) were incorporated into conservation planning beginning in the 1980s, which spurred increased emphasis on prioritizing conservation sites and strategies across regional landscapes (sometimes within and across ecoregions) as opposed to single sites as the sole focus for conservation assessment and planning (Noss 1983). There was also acknowledgement of broader landscape-level ecological processes that led to increased emphasis on maintaining the “functional mosaics” of natural communities that compose landscapes and ecoregions (Noss 1987a; Poiani et al. 2000).

Connectivity, though at first controversial in conservation planning (Simberloff and Cox 1987), became an important component of conservation plans, in large part due to increased awareness of metapopulation dynamics (Hanski 1998) and the realization that a connected system of natural areas can be a whole greater than the sum of its parts (i.e., by maintaining regional-scale populations or metapopulations that could not persist within any single, isolated natural area or reserve). Ambitious regional networks of reserves, buffer zones, and corridors (e.g., Noss 1987b), which were considered radical and impractical in the 1980s, became well-accepted, at least among conservation scientists, by the late 1990s. In particular, The Nature Conservancy (TNC) advanced in its planning from large “bioserves” (largely intact and functional landscapes with compatible human uses) in the mid-1990s (Poiani et al. 2000) to more comprehensive and representation goal-driven ecoregional plans in the late 1990s and 2000s (Groves et al. 2000, 2002; Groves 2003), with the latter usually incorporating regional-scale connectivity. Nevertheless, the science and analytical tools for connectivity planning were still limited during the time (1996–2005) that TNC ecoregional plans were developed.

In the 2020s, landscape conservation plans from TNC and partners are more explicitly considering landscape resilience and connectivity in anticipation of climate change and future land-use trends, drawing from an abundance of ecological literature supporting these approaches in the late 2000s and 2010s (e.g., Millar et al. 2007; Heller and Zavaleta 2009; West et al. 2009; Aplet and Cole 2010; Glick et al. 2011; Cross et al. 2012; Groves et al. 2012; Stein et al. 2013; Hilty et al. 2020). Federal agencies in the U.S. also adopted landscape-level, climate-informed adaptive management frameworks and new federally funded programs were established during the Obama Administration, such as FWS-led Landscape Conservation Cooperatives (but see Baldwin et al. 2018). Some large-scale connectivity plans are now incorporated into state legislation with associated funding for land acquisition (e.g., the Florida Wildlife Corridor Act; Florida Wildlife Corridor Foundation n.d.). Moreover, recent national policy seeks to address biodiversity loss and climate change by targeting ambitious goals like conserving 30% of lands and waters by 2030, adopted by the Biden Administration as “America the Beautiful.”

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