

History of the Range Curriculum: Are There New Trails?

MITCHEL P. McCLARAN

For more than 80 years, we have discussed the ideal range curriculum, professing its virtues and needed improvements. Arthur Sampson presented the first formal description of a range curriculum in 1919 when there were only two schools with degree programs, Idaho and Montana State (Sampson 1919, 1954). There have been several proposals since, and now we find ourselves asking, yet again, what new trails should the range curriculum be blazing and which old trails should we continue travelling?

Familiarity with previous curricula and their context can assist in this attempt to identify new trails, or at least help distinguish old from new. To provide that historical background, I will describe some of the developments in this history of the range curriculum. The varied developments in this 80-year history caused some difficulty in constructing this paper. However, I found such sound inspiration from the clarity and comprehension of Art Smith's (1952) statement about the challenges facing those developing a range curriculum that I will use his frame work to organize this paper. In summarizing the rigors of curriculum development he wrote:

"...those responsible for developing a course of range instruction have little time, an almost unlimited amount of information, and no precise knowledge of the individual needs after graduation of the students for whom the range curriculum is devised."

In this statement, he identified three critical elements in the range curriculum: 1) the need for a broad coverage of many subjects that include basic sciences, economics, inter-personal skills, and their applications to rangeland situations, 2) the uncertain or varied career opportunities for post-graduates, and 3) the constraints that time, personnel and funding place on curricula at universities.

These elements of breadth, post-graduate needs, and constraints provide the organization for this history of the range curriculum. I begin with an assessment of curriculum breadth, and subsequent discussion will be organized around the interaction of these elements. Within the coverage of each interaction, I note early and recent issues, and then contribute my vision of new trails that can define the course of the range curriculum in this new century.

Range Curriculum Breadth

A clear indication that breadth has been a mainstay of the ideal curriculum is seen in the content of four curriculum proposals that received wide support in their time. The proposed curricula are 1) the first formal proposal by Sampson in 1919, 2) the recommendations in 1951 by the American Society of Range Management's Civil Service-Eligibility Committee (1952), 3) the suggestions in 1962 by the Range Management Education Council (1962), and 4) the 1978 curriculum re-

quirements for institution accreditation by the Society for Range Management which are currently in use (Harris 1981). These four proposals are no substitute for examining the curriculum at every school, but they do mark the first proposal and all subsequent proposals that grew from collaborations among many university and professional participants.

Clearly, from the beginning, the breadth of coverage even within "range courses" is illustrated by the inclusion of biological, sociological, biometric, practical, and decision-making courses (Table 1). Furthermore, that breadth is apparent in the supporting courses that include soils, communications, animal science, and other natural resource topics. Interestingly, Sampson (1919) suggested the greatest number of semester units from "range" courses. The trend from specific course names, such as "Range reconnaissance" to more encompassing categories such as "Sampling, inventory, and census of rangeland resources", acknowledges the increasingly common attention to a broader array of range uses, the infusion of new technologies such as computer programming (e.g. Schuster 1992) and geographic information systems, and the recent trend of giving a more generic label to courses such as "natural resource measurements".

Some differences in breadth are worth noting. The absence of social science, communication and other natural resources courses in Sampson's proposal may stem from his assumption that all college graduates would complete English and humanities courses, and that range management was routinely taught in forestry programs at that time. But his omission of soil science is a significant anomaly.

Breadth Interacts with Post-Graduate Needs

All these curriculum proposals grew, in part, from interactions with the workplace needs of the graduate. Curriculum proposals in 1951, 1962, and 1978 were made, in part, to influence the Civil Service Commission (and later Office of Personnel Management) in developing educational standards for entry-level Range Conservationists GS-454. The claim was made that a rating system with no or low educational requirements would not be able to identify the best and most completely trained graduates (Civil Service Committee 1953, Harris 1981, Sharp 1981, Wassar et al. 1987). The federal government did not adopt the suggestions fully, or rapidly, but the proposed curricula were influential in increasing the requirement for "range units" from 0 to 6 in 1959, 6 to 12 in 1967, and 12 to 18 in 1981. Even Sampson (1919), before the Civil Service existed, envisioned an increased need for college-trained range conservationists when the federal government eventually limited access to the public domain lands and began managing livestock use.

Table 1. Historical comparison of four standards for the range curriculum.

	Range Curriculum Proposals			
	Sampson (1919)	American Society of Range Management Civil Service Committee (1951)	Range Management Education Council (1962)	Society for Range Management Institution Accreditation (1978)
Range Management Core	21 semester units	10 courses	16 semester units	18 semester units
Range Biology	Native, cultivated and associated plants	Range plants and communities; Ecology and physiology	Range plants and communities	Plant and animal identification; Ecology of range ecosystems
Range Sociology	Range history and economics	Range history, economics, policy, and administration	NONE	Social influences (e.g. economic, legal, political) on rangeland use
Range Measurements	Range reconnaissance	Range appraisal and classification	Sampling, inventory, utilization, condition, and trend	Sampling, inventory and census of rangeland resources
Range Management Practices	Management of range (suitability, season, distribution)	Range livestock management; Multiple-use; Range improvements	Range management principles (including improvements)	Art and science of manipulating rangeland ecosystems
Range Planning	Grazing working plans	NONE	Range planning and multiple use	Select, budget and plan management
Other Range Courses	Grazing and forest protection	Field application of principles	NONE	NONE
Other Courses				
Basic Biology	Plant taxonomy, physiology, and ecology; Zoology; and Genetics	Plant taxonomy, physiology, and ecology	Plant taxonomy, physiology, and ecology; Zoology	Plant taxonomy, physiology, and genetics
Soil Science	NONE	Classification; Morphology; Fertility; Erosion Control; Plant Relations	Basic course	Morphology and classification
Physical Science	Chemistry; Geology; Civil engineering; Meteorology	Inorganic and Organic Chemistry; Algebra; Trigonometry	Inorganic and Organic Chemistry; Algebra; Trigonometry	Mathematics; Chemistry; Biometry
Social Science	NONE	Economics	NONE	Some coursework
Communication	NONE	Writing; Grammar; Speech	NONE	Oral and written
Natural Resources	NONE	Some coursework	Some coursework	Some coverage of forestry, wildlife, watershed, and recreation
Animal Science	Animal husbandry; Veterinary science	Animal husbandry	Animal husbandry	Nutrition and production

Beyond the simple tally of range units, the breadth of the federal requirements is nearly equivalent to that of the accreditation standards for range management topics, except that no range sociology, basic social science, physical science, or communications courses are required (Table 2). The education requirements for the Society for Range Management's recently established program for Certified Professional in Range Management (Anonymous 1999) also fall short of the accreditation standards in physical and social sciences, and it does not require a degree in range management or related subject.

Recent comments by Malechek (1992) and Nicholson

(1992) criticized the federal standards for being too inflexible in accepting qualified coursework. This perception of inflexibility is much different than the perceptions of minimal or weak education requirements expressed by academics between 1950–1980.

I suggest that negotiations concerning the federal government standards will remain as a critical interaction that defines the range curriculum. However, I envision a new trail that will pursue additional employment opportunities, such as vegetation and wildlife habitat managers for The Nature Conservancy, other private or public land trusts, Fish and

Table 2. Comparison of curriculum requirements for accreditation, federal qualification as range conservationist, and professional certification.

	Curriculum Requirements		
	Society for Range Management Institution Accreditation (1978)	Office of Personnel Management GS-454 Rangeland Manager Series (1994)	Society for Range Management Certified Professional in Range Management (1999)
Degree	B.S. in Range Management or Closely Related Field	B.S. in Range Management or Closely Related Field	Undergraduate Degree
Range Management Core	18 semester units	18 semester units	Coursework in 10 areas
Range Biology	Plant and animal identification; Ecology of range ecosystems	Range plants; Range ecology	Rangeland plant identification; Rangeland ecology
Range Sociology	Social influences (e.g. economic, legal, political) on rangeland use	NONE	Range economics
Range Measurements	Sampling, inventory and census of rangeland resources	Range inventories	Rangeland vegetation measurement
Range Management Practices	Art and science of manipulating rangeland ecosystems	Principles of range management; Range improvements	Rangeland vegetation management; Rangeland animal management
Range Planning	Select, budget and plan management	Ranch or Rangeland planning	Rangeland or Natural Resource policy and planning
Other Courses		Plant, Animal and Soil Sciences (15 units) Resource Management Studies (9 units)	
Basic Biology	Plant taxonomy; physiology; and genetics	Plant taxonomy, physiology, or ecology	Plant physiology
Soil Science	Morphology and classification	one course	Soil taxonomy
Physical Science	Mathematics; Chemistry; Biometry	NONE	NONE
Social Science	Some coursework	NONE	NONE
Communication	Oral and written	NONE	Interpersonal communications and discussions
Natural Resources	Some coverage of forestry, wildlife, watershed, and recreation	Agronomy, Forages, Forestry, Recreation, Resource Economics, Watershed, or Wildlife	NONE
Animal Science	Nutrition and production	Animal Sciences (e.g. nutrition, livestock production)	NONE

Wildlife Service, and National Park Service. Can we bring even more zeal to these discussions than our predecessors did with the Civil Service Commission 50 years ago?

Post-Graduate Needs Interact with University Constraints

The tension between the needs of post-graduates and the constraints of the university system are best illustrated in attempts to reach a consensus on the mix of fundamental and technical courses. The challenge centers on devising a curriculum that develops the technical skills that are expected on the first day of work, and fosters the understanding of fundamental concepts and cognitive skills needed to meet the more complicated situations and leadership responsibilities that ensures a successful career 5–10 years later.

There has been no shortage of opinions expressed by university professors on the virtues of the fundamental education; where concepts and critical thinking skills are emphasized

over the rote mastery of facts and practical skills (Sampson 1919, 1954, Smith 1952, Tisdale 1956, Heady 1961, Malecheck 1992, Nicholson 1992). Smith (1952) captures this sentiment best in his essay on the goal of a range education:

“Moreover, it is easier to improve ones skill and become familiar with the “tricks of the trade” on the job than it is to acquire a sound philosophical and basic understanding of fundamental problems. If range management as a profession is to make the most rapid advancement, we must instill understanding in the student even if it be at the expense of familiarization with the less important though relevant facts”

Historically at least, some employers felt differently, suggesting that graduates were deficient in practical knowledge. This disparity was greatest for private ranch employers who expected more training in practical matters compared to federal employers (Kienast and Scifres 1973).

Comments made more recently, suggest that the pendulum

is on its return swing. Noting that an increasing proportion of contemporary range students have an urban background, and are not likely to have much practical experience or applied-outdoor skills, Malechek (1992) suggested that the curriculum may need to enhance the coverage of practical skills.

In addition to balancing conceptual and practical pedagogy, I see opportunities for a new trail that includes the development and integration of a vital continuing education curriculum within our universities. The most obvious demand for continuing education will come from the new cadre of Certified Professionals in Range Management who will be required to complete at least 32 hours of continuing education every two years (Anonymous 1999). The demand for a well-conceived and executed continuing education curriculum should easily draw students from beyond the certification ranks. Will these be popular enough to stimulate universities to develop a hybrid of the traditional classroom and continuing education curricula? Who will instruct these courses, and how will the conceptual and practical pedagogies be balanced? The range discipline has some experience with continuing education through Cooperative Extension and federal agencies (e.g. Busby 1992). Some additional guidance may come from a recent assessment in the forestry discipline that shows a demand for training outside the traditional disciplinary skills. Forestry employers rated the five most important topics for continuing education to be the non-traditional and less "technical" topics of rural and community development, alternative dispute resolution, foreign languages, managerial leadership, and organizational development (Sample et al. 1999).

Curriculum Breadth Interacts with University Constraints

It is inevitable that the ideal curriculum will be constrained by the realities of operating a university or college. The interaction between breadth and constraints have been expressed in two ways: 1) perfecting the ideal and 2) distilling the essential. In the former, we have a history of adding new topics and information. In the latter, when constrained by resources, we are forced to select those essential components that we can afford to offer.

Fifty years ago, calls for perfecting the curriculum included the addition of non-range courses such as economics, business, psychology, sociology and communications (Heady 1951, Sampson 1954). Sampson (1954) suggested that

"...range students are often poor in rhetoric, which affects their ability in writing and public speaking. Their background in economics is deficient, and many receive no training in psychology or sociology. Correction of these weaknesses may be made by increasing the number of electives, by concentrating more on the professional courses, and by setting up a minimum of required courses and credits in range management and closely allied subjects."

Communication skills continue to be identified as an area for improvement, as are applications of sociology and psychology in the form of working with diverse groups through collaboration and conflict management (e.g. Sowell 1997). At

the same time, educators need to add the latest knowledge and technology to the curriculum (Schuster 1992). Malechek (1992) suggested that we make room for new knowledge and technology by first streamlining the curriculum rather than eliminating the broad coverage of social sciences, communications, humanities and art courses because "Range students, in particular, need intellectual broadening in order to deal with the diversity of people and values they will face in their jobs."

Recently, Heady (1997) lamented the declining use of field exercises because the ability "...to read and understand the signs of ecosystem change [is] basic to our profession." The comparison of the four standard curricula (Table 1) shows that starting in 1962, the field course was dropped. However, the 1978 accreditation standards include a provision that field and laboratory instruction be included in many courses, rather than in one specific course.

I do not hesitate to predict that the fifty-year-old tradition of maintaining a broad curriculum will continue, even at the expense of technical coverage. It is likely that we will more frequently see coverage of topics like conflict management, which has already taken place in the forestry curriculum (Harman et al. 1999). Is there a new path, or an additional path for the next century? Will we experiment with a five year curriculum, or a five year non-thesis, technical degree? If so, will it be much different than the 5 year program proposed by Sampson in 1954?

Today, range management programs generally have less support from the university administration than during the 1950–1970s when many of these ideal curricula were proposed. In the administrative environment, student enrollment and number of degrees granted have always been measures of success and a magnet for resources. However, student numbers in many range programs have declined or stagnated. As a result, administrators have been forced to reduce or merge courses with other disciplines, and faculty positions have been lost through attrition (e.g. Malechek 1992). Despite this trend, the proportion of range schools meeting the standards of the ideal curriculum was greater in 1999 than ever before (Table 3).

Table 3. History of schools meeting the 3 different curriculum standards.

Year of Standard	Schools Meeting Standards and Number of Other Schools Offering Range Courses
1951	In 1954, only 3 schools, Texas A&M, Utah State, and Wyoming met standard of 10 range courses (data from Heady 1951)
	12 other schools offer range degrees and 16 more offer range courses
1962	In 1960, only 3 schools, Colorado State, University of Montana, Utah State met standards (data from Heady 1961)
	12 other member schools of Range Management Education Council did not qualify
1978	In 1999, 10 schools, Arizona, Colorado State, Idaho, Oregon State, New Mexico State, Texas A&M, Texas Tech, Utah State, Wyoming, Washington State met accreditation standards 19 other schools offer degrees or coursework in range management

The history of accreditation may inform us about future developments in the range curriculum in the face of declining administrative support. The acceptance of an accreditation program in the Society for Range Management was resisted because of lasting bitterness surrounding the second-class treatment of range managers in the Society of American Foresters (contributing to the establishment of the American Society of Range Management), and concerns about elitism held by universities with less well developed programs (Harris 1981). Will the curriculum standards be modified if universities are unable to maintain their accredited status? As a matter of self-preservation, I envision that a new path for the range curriculum will be a more generous acceptance of range management instruction when delivered in interdisciplinary "natural resource" courses. This may even raise the number of qualified schools. More importantly, I think it is essential that we participate in the design of these "integrated" courses so that they do not abandon the range management discipline. After all, successful interdisciplinary education is dependent on successful disciplines.

Summary

In the past 80 years, the range curriculum has grown in breadth, it has been used to set education standards for post-graduate employment by the federal government, and it has reached a high degree of standardization among universities. In large measure, the future developments in the curriculum will build on those of the past 50 years. In addition to the continuation of these trends, I propose that we should blaze these new trails:

- The promotion and coordination of the curriculum with non-traditional rangeland management employers to convince them that we produce a broadly and soundly trained resource manager.
- The development and integration of a rigorous continuing education curriculum within our university systems that builds on existing faculty and instructional resources.
- Nurture the development of "interdisciplinary natural resource" courses that do not abandon the range discipline.

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Author is Associate Professor of Range Management School of Renewable Natural Resources, University of Arizona, Tucson, AZ 85721; 520-621-1673 (voice), mcclaran@u.arizona.edu