Maine Coast Heritage Trust (MCHT) is pleased to present this *Organic Blueberry Transition Guide*. It is the culmination of many aspects of our blueberry work since 2008, when MCHT acquired the Bog Brook Cove Preserve, including 80 acres of commercial blueberry land. With the help of the Washington County Tax Increment Financing (TIF) program, we were able to conduct a 3-year research project while transitioning the land to organic management. This included hiring researchers and summer crews for weed control and other work for all three years.

The Preserve blueberry fields are now organically managed under two separate leases, the larger one with Mark Jacoby and Lisa Mushrall. Mark is the primary author of this Guide. MCHT also initiated and facilitated a blueberry value-added market feasibility effort, indicating enormous potential for organic berries, funded by The Stephen and Tabitha King Foundation, Maine Technology Institute, Broadreach Foundation and the Partridge Foundation. Involvement of Washington County growers, both organic and not, was essential to all aspects of this work.

Why and how to transition? This Guide helps growers and growers-to-be answer those questions.
This guide explains how to transition a conventionally managed wild blueberry field to organic management and why you’d want to do so. It will help you decide whether the land you’re considering for transition is suitable for organic management and whether you’re likely up to the challenge of managing it. It also offers specific recommendations based both on research and the experience of organic growers for tending your transitioned field and more general advice for managing all aspects of an organic blueberry enterprise, including fieldwork, harvesting, and marketing.

“Organic production” is here taken to mean the commercial production of an organic blueberry crop that realizes a positive return on investment, or profit. That’s the focus here because it’s the return you derive from your farming efforts that funds all the other benefits to be derived from them—it’s the means of bringing these other benefits
to you and the wider world. And these benefits are many: to you comes the opportunity to do enjoyable and meaningful work in a beautiful and safe environment according to the natural cycles of the plants you nurture along, of the weather and seasons; to your community comes healthy local food and a more sustainable local economy; and to the entire planet comes the ecological richness of land optimally used in a natural way—you’re not just creating a farm, but also a refuge for the flora and fauna already living there, for countless billions of micro-organisms that make the living soil that sustains healthy plants, for native pollinators and other insects, for birds and mammals and amphibians, for all the flora and fauna that might otherwise be imperiled by conventional agriculture. You’re able to maintain this haven, this place where your children may safely wander, where you may work unprotected from all but the sun, through that positive return you derive from your farming efforts.

The setting for these efforts will be one of the hundreds of small blueberry fields scattered throughout southern and eastern Maine—some small patch of land on which to stake your fortune, but which? What makes one field better for organic management than another and how can you tell the difference?

Seeing that difference requires a particular kind of vision. It’s what you bring to that blueberry field you’re considering for transitioning, a way of assessing the land and the plants growing there, but also of assessing yourself, your skills, resources, and level of commitment. This guide, together with a healthy dose of introspection, will help you to develop that vision. The first step is to consider the crop you would raise, the wild blueberry.

The Wild Blueberry

A member of the heath family, the wild blueberry, *Vaccinium angustifolium*, is a low-growing biennial shrub abundantly native to Maine and the Canadian maritimes. A field of blueberries is actually an aggregation of clones, of islands of genetically identical plants. This is most easily seen in the fall, when the dramatic color differences among the reddening clones makes them readily distinguishable. These clones vary slightly in the timing of blossoming and fruiting, but not so much that they can’t be managed as a
collective whole. The plants generally blossom in May, the field then appearing lightly frosted, and develop ripe fruit in August, which in their millions tinge the field blue. A wild, unmanaged field will have some plants fruiting and others growing vegetatively during the same year, but such a field is inconvenient to the grower, who would like to have all the plants fruit in one season. The way to make this happen, to synchronize the life cycles of all the blueberry plants in the field, is to prune the plants down to the ground in late fall or early spring following on the preceding August’s harvest. This pruning, accomplished either by burning or mowing, causes the blueberry rhizomes to sprout fresh stems. These stems spring from the ground healthier and less branched than their unpruned brethren and all timed for vegetative growth. All three features—healthful vigor, less branching, synchronized plant behavior—are important for a robust harvest of high-quality fruit.

The stems grow until about mid July, attaining a height of about eight inches, then form fruit buds late in the season before dropping their leaves and lapsing into dormancy before the onset of another winter.

During the following spring, generally around the middle of May, these buds blossom and, if sufficiently pollinated, bear the blush blue fruit for which the plants are known.

**Managed Blueberry Land**

Maine’s native blueberry lands, from the many thousands of acres of barrens in Washington County to the countless isolated fields and roadside clumps dotting the eastern and southern parts of the state, are all alike in having been naturally colonized by the wild blueberry plant; it’s in this sense the fruit may be called wild—the land was neither cultivated, nor planted. This isn’t to say it
isn’t managed, however: intensive efforts by hundreds of trained workers using many thousands of pounds of chemicals and a huge assemblage of trucks, tractors, sprayers, spreaders and mowers swarm over the fields every season, their efforts aided by millions of honey bees winging out from tens of thousands of imported hives, all working together to produce that annual eighty or so million pounds of blueberries from Maine’s conventionally managed blueberry acreage.

Organically managed land is but a very small part of Maine’s commercially managed blueberry ground—about one-and-a-half percent—and for good reason: organic blueberry land is considerably less productive. Those expert conventional growers—aided by decades of research by the University of Maine as well as by every farmer’s hard-earned expertise—can produce up to 12,000 pounds per acre, three to six times the amount you’re likely to produce on the best managed organic blueberry field. But to achieve that awesome productivity the conventional grower may spray or spread up to three dozen chemicals on his fields, wiping out native pollinators and the other beneficial insects living there, and perhaps leaving persistent residues that will inhibit their return.

Organic blueberry culture is more labor intensive, but also safer, generally (though not necessarily and not always) more environmentally friendly, and can be equally or more profitable. This is the relatively untold story of much of organic agriculture—it can be more profitable. This has been well and repeatedly documented among corn and soybean growers, for example, and is just as true for organic blueberry culture—land organically managed by the adept grower can produce yields that when properly marketed produce a greater return per acre than conventionally managed land. (see: Return on Investment—Doing Well by Doing Good)
Blueberry Land Suitable for Organic Management

A plot of land naturally colonized by wild blueberry plants is where you’ll establish your organic farm, but what land? What specific characteristics should this land have to make it suitable for an organic blueberry farm? If your goal is to hand pick enough berries for you and your family, any land that naturally grows blueberries will serve, but to get that reasonable return on your efforts the best land to transition to organic culture will have these five features:

- It has mostly blueberries already growing there,
- It has been continually managed,
- It has been managed to lower pH,
- It is flat enough to mow and perhaps to mechanically harvest, and
- It does not abut a conventional blueberry field.

This is the ideal scenario, but it isn’t necessary to satisfy all five criteria to manage blueberries organically and show a good return for your efforts. There is profitably managed organic blueberry acreage in Maine that initially satisfied none. And there are assumptions underlying these criteria that may not matter to you, especially the last two. Let’s consider them in detail.

Work land that has mostly blueberries already growing there—This seems too obvious to mention, but it’s actually quite common for blueberry growers to bring land into production that had formerly been partly pasture or forest understory; indeed, this kind of conversion accounts for just about all of the recent increase in Maine’s blueberry acreage. It’s accomplished by mechanically removing competing vegetation (mow the grass, fell the

A productive organic blueberry field also looks like this—about 3,000 pounds per acre were raked here. The trees are growing in bare spots, which the grower may eventually want to mulch as her return on investment allows.

This, too, is good blueberry ground—producing over 2,000 pounds per acre—but will be better when the effects of sulfuring take hold.
trees, burn the residue), spraying herbicides to inhibit its return, and then spreading fertilizers to encourage the remaining blueberry clones. It’s a method that can work very well but is not available to you as an organic grower, which is why you must be choosier on where to focus your efforts. On the other hand, you could transition land that isn’t yet suitable for organic management by first managing it conventionally, then organically once you have it cleaned up. This is a great way to bring marginal land into organic production, but as the focus of this guide is the process of transitioning conventionally managed blueberry land to organic production, the first step in this process—the conventional management part—isn’t addressed here. See the Resources List for where to turn for information on conventional management.

*Work land that has been continually managed*—Blueberry ground that has been continually managed—especially conventionally managed land—is relatively free of weeds, and since weed management will be your greatest challenge, starting off with a clean field will make for a more promising beginning. A field overrun with grasses and pH-sensitive weeds can be transitioned with relative ease (see sidebar: Weeds!), though perhaps over an agonizingly long time, but a field overrun with acid-friendly weeds such as sweet fern, rhodora, and lambkill can be too challenging for a reasonable and timely return on investment.

*Work land that has been managed to lower pH*—Such land is already well on its way to efficient organic management because a field with a pH below 4.5 or so is generally inhospitable to grasses and most herbaceous weeds. pH management is your most essential (and probably most expensive) early management task, and you’re way ahead in your effort if the former manager attended to it.

*Work land that is flat enough to mow and perhaps mechanically harvest*—This is where the list of criteria may be less relevant to you. The most cost-efficient way to manage blueberry land is to prune by mowing and to harvest mechanically (though see the sidebar, *Farming in the Age of Climate Change* for a discussion of pruning methods); this is why the larger blueberry operations throughout the state have worked so hard over the last decade or so to de-rock and flatten their fields. But these efficiencies matter most for large fields. A relatively small field—10 acres or less, for example—that is very rocky may also be very productive—the reflected heat from large boulders making for an earlier crop with larger fruit. And if you were already intent on pruning by burning and harvesting by hand raking (perhaps with family members and friends, aided by a regular
paid crew if necessary)—you may have in that rocky or hummocky field an excellent prospect for a good return on investment.

Work land that does not abut a conventionally managed blueberry field—The current regulatory structure holds that as an organic grower you must maintain a buffer strip on your land that you must manage organically but market the fruit growing there as conventional, this because of the likelihood of spray drift from that abutting conventional field contaminating your berries.

Incredibly, that conventional grower is not required to ensure that the chemicals he sprays on his land stay on his land alone (in effect, he gets to manage his land and part of yours, too). That buffer between his land and the part of yours you can call organic can be as much as 100 feet wide and, depending on the shape of your field, can be quite a large share of the land you’re managing. It can also be quite expensive: there are organic growers who lose thousands of dollars every year because they must employ their costly organic management techniques to produce conventionally priced berries in the buffers they’re obliged to maintain along conventionally managed land. But this burden may be slight for your particular field if, for example, only one small corner of your field abuts the conventional grower and thus the resulting buffer strip is small. You could also reduce the width of the buffer by planting a windbreak along the conventional field. And, finally, that buffer may be less a burden for you if you have a ready and lucrative fresh market for conventional as well as organic berries and won’t mind marketing both. A note of caution on this last point: managing both buffer and organic land will complicate your farming enterprise and add some costs, this because you’ll need to ensure that you use separate equipment
for the buffer and organic land (crates, rakes, even farm equipment), or that you wash equipment used on the buffer strip before using it on the organic land (and be able to document having done so with a cleaning log). This is the sort thing your fellow organic growers have already accustomed themselves to doing, but it can seem quite the bother for the overworked grower first starting out.

A final point about managing the buffer strip is perhaps you won’t need to—if you can convince (or help) your conventional neighbor to minimize his drift. Most people strive to avoid harming others; give your neighbor the chance to avoid harming you.

This may seem like a daunting list of requirements, but keep in mind that not all need be met — this is a best-case scenario — and that depending on your degree of commitment and energy, much less suitable land can be brought into profitable production. Much depends on what you bring to the task of farm manager.

To be a Good Farm Manager

To be an organic farm manager you must first have the requisite knowledge needed to operate a farm, and such is the ready availability of expertise that anyone who can read could be a successful organic blueberry grower if that were all that is needed. But there is an additional requirement that is likely just as crucial: the consistency of your efforts. What matters perhaps more than anything else in organic blueberry culture (as in all farming) is that you consistently tend to your work, that you apply the appropriate effort at the appropriate time. When to prune the clones, when and how often to remove which sort of weeds, when to set out bees—all these tasks and more must be performed at the correct time, which varies slightly according to weather and geography, to be effective (see sidebar: A Year in the Life of a Blueberry Grower). If you’re going to manage an organic blueberry enterprise successfully, you must learn the seasonal patterns of work required for your specific field and then consistently apply that knowledge to your management efforts—you must follow the calendar of your seasonal work, year in and year out, to achieve that steady state of reasonable return for reasonable effort that defines profitable farming.
Farming by fits and starts may make for an enjoyable hobby, but it won’t likely generate the income needed to reward and continually finance your efforts.

In addition to being knowledgeable and diligent in your work habits, as an organic grower you must come to accept the inevitability of record keeping. There’ll be myriad purchases, behaviors, processes, and yields to track and report to your organic certifier, as there will be to your banker, perhaps, and to the IRS, certainly. There’s no point in railing against this sort of thing, as many are inclined to do: it’s a natural part of the work you’re taking on, and having done it, it’s quite likely you’ll find that the record keeping you do benefits you more than those who require it—keeping and examining records of what you do are the first steps to doing it better.

Need you undertake the physical work? Need you pull the weeds, rake the berries, push the mower, or drive the tractor? Not at all: as you would do in other realms of your life, you’re free to choose that combination of delegation and personal effort that works best for you. The more you delegate, the less you’ll earn, but everyone has her own calculus for what’s worthwhile. Would you rather paint your house or earn the money to hire a painter? It’s similar with organic blueberry culture save for the fact that you’re probably better off if you’re the possessor of the expertise, or at least the scheduler of effort. Someone has to know what’s needed when in the management of your blueberry field, and unless you’ve hired a paid manager (whose efforts you still must oversee), you’re best off being that person, if only to ensure there is one.

This last point bears some elaboration if you hire a farm manager. It is often the case that fieldwork schedules must be greatly modified, perhaps even ruined, by the weather. Sometimes it’s a mad rush to get burning or mowing done if mud season is late or if there’s too much spring rain, and on rare occasions not all fieldwork gets done. The only way to ensure that your field is not the one left untended is to know what work must be done when so you may guide your manager in his efforts.

If you have access to good blueberry land and are of the right disposition, then you have what you need to manage blueberries organically—everything else you can readily learn.
How to Begin

A blueberry field that is certified organic is one that has been free of synthetic chemicals for at least three years. If you’ve recently acquired blueberry land, your first task is to learn its management history. If you can’t be certain that synthetic chemicals haven’t been used on your land prior to the day you acquired it, then that three-year clock must start on that date.

During this three-year transitioning period you must manage the land organically but market the berries you harvest as conventional berries. But how? There are three elements here to consider: organic agricultural management, harvesting of the crop, and marketing.

Organic Management

Begin your management by reaching out to those already working in the field who are poised to help you. You’ll find at the local Natural Resource Conservation Service (NRCS) office, a part of the US Department of Agriculture, agents that can help you with technical advice and often with cost-share programs to help you remove rocks from your field, or lay mulch, or irrigate. Right next door, at the Farm Service Agency, will be a loan officer to help you finance your blueberry enterprise. Your federal government is supportive of small farmers and early on you should contact your local office to find out how.

The University of Maine Cooperative Extension Service is another excellent resource, perhaps your best companion in your journey to becoming an organic wild blueberry grower. The service has a dedicated Wild Blueberry Specialist and a long list of publications exactly tailored to your requirements as a blueberry grower, some of which specifically address organic management techniques. You’ll want to get on the mailing list for the blueberry newsletter. The university also conducts field days each spring for growers in order to share recent research findings and recommendations and arranges an organic field day, a
chance for organic growers to visit other organic fields and learn from the growers there. It would be wise to attend these.

You’ll also want to arrange for organic certification. Most in Maine use MOFGA Certification Services. MOFGA, the Maine Organic Farmer’s and Gardener’s Association, also has an organic transitions coordinator for blueberries it would be worthwhile to consult (see Resources List).

Perhaps your most valuable connection to the world of organic blueberry culture will be an already-established grower. A search of the MOFGA website will reveal who’s growing organic blueberries in your county; you could tentatively reach out to one of these growers to seek advice. Don’t be surprised to find that grower unavailable—she’s probably scrambling to make a living just like you and may not have time for unpaid consultation. But do try another—there are many growers eager to share their store of hard-earned knowledge.

Once having established connections with these people and organizations, your next task will be to take soil samples of your field and send them off to the University of Maine Analytical Lab. There is no more important first step than learning the pH of your fields. Many fields formerly in meadow or pasture, and many conventional blueberry fields that have not been managed for acidity, have a pH of around 5.5. This isn’t ideal for grasses, but it’s plenty close enough, as a glance at any abandoned pasture may attest. Your job is to get the pH of your fields lower than 4.5, which you may do by spreading pelletized sulfur (the formulation of which must be listed as acceptable for use in organic agriculture by the Organic Materials Review Institute, OMRI). You spread 1,000 pounds per acre per pH point lowering desired. Thus to reduce the pH from 5.5 to 4.5, you must spread 1,000 pounds per acre; to go from a pH of 5 to 4.5, you spread 500 pounds per acre. An important detail to know is that it takes about three years for the effect of the spreading to be mostly realized—thus, you’ll want to spread sulfur as early as possible, which you may do either before bud emergence in the spring, or following on harvest in the fall. Lowering pH is probably your most crucial early management step.

You’ll also want to map your field early on to determine where to put your management efforts. You may find, for example, that parts of the field that were once conventionally managed won’t be worth managing organically. This is especially true for fields that have lain fallow for an extended period—in such a case you may find that

This field was sulfured two years before this photo was taken. Another year will make a big difference.
part of the field is overrun with sweet fern, lambkill, or rhodora and cannot be profitably brought into organic production, at least not initially. Your best bet may be just to keep the area sickle mowed at blueberry canopy height until you’ve brought the rest of the field into reasonable shape.

Also, you’ll have to determine how best to manage bare spots. Mulching is certainly a good idea to suppress weeds, to lessen moisture wicking, and to encourage the inward spreading of the surrounding blueberry clones. Cost-share funds are often available from the NRCS. Leaving or planting a tree in the bare spot may be a better strategy—perching birds will seed the spot with their droppings and the shade will eventually encourage blueberry rhizome growth. Mulching may well be your eventual strategy, especially if you prune by mowing or harvest mechanically—steering a mower or harvester-laden tractor around any sort of obstruction (such as the tree you may have planted to shade a bare spot) makes for a slower job and a poorer result.

This business of mapping your field and deciding upon a strategy for managing it is part of the process of letting go of the conventional agriculture ideal—that field that is perfectly weedless from edge to edge. That field, like a suburban lawn, has a particular aesthetic appeal to many, the uniformity suggesting a kind of utopian ideal, but however beautiful to the eye, it’s not the beauty of the natural world and is unattainable without heavy chemical input. Your ideal field may have an area where you’re actively hand weeding, an area with shading trees, perhaps another with golden rod and fall asters as forage for native bees. It will, in other words, be an ecologically complex assemblage that also produces a large crop of blueberries. It may have a continuing food source for native pollinators, shade for

This formerly extremely productive field—over 5,000 organic pounds per acre were harvested here—is now losing ground to bracken ferns. The grower can pull these out or top prune above the blueberry canopy repeatedly—or content himself with a smaller field.

The first map of an organic blueberry field—and an important step toward developing a management plan.
spreading blueberry clones, mulched areas where the likely return on effort seems reasonable. It may also have areas where you’re mowing at blueberry canopy height to remove sweet ferns while preserving the blueberry clones beneath. It will not have the look of a fallow field, but its zones of activity will be varied in size and distribution and appearance. A field managed in this way can produce four to five thousand pounds per acre, though more usually two thousand, all the while continuing there beautifully pristine and unimperiled because you’ve allowed for its usual ecological role as home to countless beneficial insects and a rich variety of flora and other fauna.

One last early step you may want to take in your agricultural management is to learn how to encourage native pollinators. Every blueberry blossom must be pollinated to produce fruit, with multiple pollinations needed to produce the largest berries. You can enhance pollination by renting honey bee hives, buying bumble bee hives, and especially by encouraging native pollinators, which you can do by ensuring the availability of a continuing source of nearby pollen-producing plants throughout the growing season, by setting out nesting boxes, and by timing whatever pesticide applications you make to minimize harm. In your conception of your ideal blueberry field, think about it from a pollinator’s point of view and begin early to do all you can to make your field hospitable to them. The University of Maine Cooperative Extension Service Blueberry Fact Sheets offer a great deal of guidance on how to encourage native pollinators, which you should certainly do not only as a boon to the natural world, but also as a means of increasing your return on investment (see sidebar: Two Lines of Evidence in Favor of Promoting Native Pollinators).

Harvesting and Marketing

Whether it’s more lucrative to harvest your field by hand or machine (either by walk-behind or tractor-mounted harvester) depends on the characteristics of your field, whether flat and weed-free enough for mechanical harvesting; the availability of labor; and the relative costs of both. A walk-behind or tractor-mounted mechanical raker can harvest berries that rival
hand raked in quality, but only on flat ground that is relatively free of weeds.

Of course, financial return is not the only standard by which to evaluate harvest methods. Some growers find that the quiet, steady rhythm of hand-raking is an essential part of the organic blueberry growing experience. The clatter and roar of harvesting machinery is a price you pay to get your crop in; that swish of the rake is a benefit you derive along with your berries.

More important to your return on investment than how you harvest your berries is how you market them. The marketing strategy with the best return is to acquire (or work with someone who has) a fresh-pack line, the equipment to clean the field berries, and then to market them fresh or frozen directly to consumers or to farm stands and restaurants (see sidebar: To Pack or Not to Pack). This can be expensive to get into—a line can cost $7,000 to $15,000, depending on size—and quite labor intensive, but a crew of four to six can produce perhaps 100 or more pints per hour of blueberries ready for market on a fresh-pack line, and at $3 or more per pint for organic berries, the returns add up quickly.

A less lucrative approach to marketing your crop, yet very much worthwhile, is to take your field berries to a processor who is a buyer of certified organic berries right from the field. Merrill’s Blueberry Farms in Ellsworth is one such, and there are small packers with fresh-pack lines
who are often in need of supplemental berries. Taking your berries to someone else to process entails a lower return, but also much less labor. You may find that the amount of work required just to get the crop in will be quite enough.

What you’ll not want to do with your certified organic berries is to market them as conventional (except for those transition or buffer berries). In patiently nurturing your crop and bringing it to market, you have produced among the world’s finest foods and you certainly won’t want to discount it.

**Becoming an Organic Grower**

Small farming in Maine is more a community meeting than a closed fraternity and anyone who would risk time and fortune is free to join. It’s a wonderful, bracing sort of experience and unequivocally good work to have done, but it may not be the only work you need do—most small farmers must supplement their income from time to time. You’ll need to be both flexible and adaptable in your financial management to be an organic blueberry grower.

This brief guide intends to suggest how to approach growing organic wild Maine blueberries. If you read the materials in the resource list and seek out the expertise of those readily available to you, you will find yourself perfectly equipped to grow organic blueberries and to bring your berries to market.

**Farming in the Age of Climate Change**

Traditional practice—dating back to indigenous peoples who themselves may have been inspired by the effects of lightning storms—is to burn blueberry fields to prune them. This is still standard practice on fields that are too rocky or hummocky to mow. And until quite recently the environmentally responsible approach to blueberry management seemed to favor straw burning—those who continually mowed also had to spray more chemicals because of greater infestations of fungal diseases, some insects, and weeds. But that approach now seems from an earlier age, the time before we knew of global climate change.
What’s the harm in burning with straw? The harm comes from releasing 2,500 lbs. of CO₂, an important greenhouse gas, into the atmosphere from the burning of the 35 or so bales of straw you spread on every acre of the field to cause the burning of the blueberry clones. You could drive to Los Angeles and half way back to release as much CO₂ into the air from the tailpipe of an efficient late-model car as you would from burning just one acre of blueberries.

Current regulations allow for the organic grower to burn his blueberry fields with fuel or boiler oil and those who do release only about 400 lbs of CO₂ per acre pruned, but the oil they’re burning is contaminated with harmful chemicals and heavy metals that you’d rather not eat.

The grower who mows his field releases about 50 lbs of CO₂ per acre mowed, about the same amount you’d release by driving about 100 miles in that modern car, or 2% of what you’d release with straw burning.

Of course, the CO₂ arising from the burning of living plants like trees or straw is not a net addition to greenhouse gases the way that burning fossil fuels is, but it’s an addition nonetheless and should be avoided or at least minimized whenever possible.

Why not just give up burning altogether on fields that can be mowed? You’ll probably want to include occasional burning in your pruning strategy because it’s the surest way to boost yields. Research by University of Maine scientists (as reported in the indispensable Cooperative Extension Fact Sheet 304: Organic Wild Blueberry Production) found that yields improved with burn pruning over mowing—and that burn pruning and the application of sulfur acted synergistically to improve yields. Similarly, research by Kristin McGovern and Melissa Lee at the Maine Coast Heritage Trust’s organic blueberry acreage at Bog Brook Cove revealed a positive correlation of burn pruning and yield (see Resources List).

While it’s clear that burn pruning improves yield, it isn’t well-known (and indeed may be too field-specific to be known in a general way) how frequently one should prune by burning. Given that burn pruning is more expensive and environmentally problematic, a conservative strategy suitable for fields than can be mowed might be to alternate mowing and burning. Pruning in this way will be less costly, better for the planet, and plenty good enough for disease, insect, and weed control. The only definitive way to know the best strategy for your particular field will be to conduct long-term trials comparing pruning methods and yield.
Weeds!

Your blueberry field is also a field of asters, of dogbane and sorrel, of rhodora and sweet fern and birch saplings and, especially of grasses, great amber stands of waving grasses, orchard grasses, bunch grasses, and corn grasses. And sedges in the damp spots, and rushes. All this lush exuberance is competing vegetation and is undesirable on that account because it lowers your yield—the nutrients that would otherwise go into your plump fruit are being taken up by the weeds—and because it makes harvesting high-quality fruit difficult: pulling a blueberry rake through all that vegetation slices and bruises the berries.

As an organic grower, you can’t target undesirable vegetation with herbicides, you can’t obliterate those weeds. You’re going to learn to have to live with greater weed pressure than the conventional grower and to have lower yields as a result. But though you won’t be able to eliminate all weeds, you can keep them in check and attain reasonable yields for your efforts. You’ll do this by learning to focus your efforts where they’ll make the most difference. Here’s how:

Managing grass and other pH-sensitive weeds—The likely first step for any field you would manage is to lower pH, but you won’t know for sure without first taking a soil sample. The University of Maine’s Analytical lab is where you’ll go for the soil sample box and the directions for how to take the sample.

Your goal is to have a pH below 4.5 and you lower it by spreading pelletized sulfur. Don’t be discouraged when you see that all than money and effort you invested in spreading sulfur has made no immediate difference—it can take three
years or more, depending on the characteristics of your soil—for the pH lowering to
occur, which is why you must attend to pH lowering as early as possible. Realize, too,
that grasses and pH-sensitive weeds can grow tolerably well in soils that are both low in
pH and oversupplied with nutrients. One conventional grower raising blueberries on a
former peat bog in Jonesport with a pH of 3.9, for example, still had to apply herbicides
for weed and grass control because he had spread so much diammonium phosphate
fertilizer. If the former manager of the land you’re transitioning used a great deal of
chemical fertilizers, and especially if he used a formulation well-suited to grass and
herbaceous weed growth, you may find your transition will take a bit longer than it
otherwise would have while that fertilizer leaches from the field.

Lowering pH will not entirely rid your field of pH-sensitive plants and grasses.
You live with what grasses persist and work toward removing the other weeds by hand,
just as you would the acid-loving weeds and saplings.

Managing acid-loving plants,
other residual herbaceous weeds,
and saplings—This is the part of
organic blueberry culture
where you’ll likely devote the
greatest amount of physical
effort and where your efforts
will likely make the greatest
difference. The effort is hand
weeding, which you may think
of as a continuing exercise in
starving weeds of their
nutrients. Blueberry plants are
great at colonizing abandoned
fields and forest understory and
persisting at densities too low
for commercial management; to
increase their densities you must continually remove competing vegetation, you must
starve it out. You do this mainly by continually removing the part of the weed or sapling
above the soil surface—you force the offending plant to use up its energy producing top
growth. Eventually the plant runs out of energy and dies.

The best approach is to remove the top growth once every month during the
growing season, roughly June 1st, July 1st, and August 1st, though you may need to do
the third iteration early so as not to conflict with the harvest. Experience dictates that
this schedule will produce the best result, that in giving the plants that month to
channel the store of nutrients in their roots and rhizomes into top growth, you’ve
maximized the harm you cause to the plant by the removal of that growth.

This excellent organic blueberry field has just produced over 3,000
pounds per acre. The grower’s sure to be nervous about
encroaching weeds, though, and probably knows she’ll have to
commit more resources to weed management if she’s to preserve
such high productivity.
There’s probably little point in going out and removing the top growth just one time. Indeed, research by Kristin McGovern and Melissa Lee at Bog Brook on the single annual removal of dogbane (*Apocynum androsaemifolium*) by three different methods largely found that no method employed just once made much of a lasting difference.

You remove the top growth by pulling or cutting—there are many ways to accomplish this, depending on the particular weed you’re removing. You may either take the weedings to the edge of the field, where it’s best to make distinct piles, under which bumble bees may burrow their dens, or to spread them in bare spots—if the weeds don’t have mature seeds—to lessen moisture wicking.

When to weed? First consider that it’s never wise to wander about in your field when it’s wet—either early in the morning before the dew has dried or too soon after a rain—because you’ll facilitate the spread of disease if you do. Also realize that you want to focus your efforts on the field during the vegetative part of its cycle. Weed during the prune year and stay off the field as much as possible during the fruiting year.

How much to weed? There are too many variables linked to weeding to allow for a definitive answer. Realize, though, that you’ll never be able to completely remove all the weeds from your field and that at some point, the return on the weeding effort won’t justify further cost. Where that point is depends on the amount and kind of weed pressure on your particular field, or on the particular part of the field you’re weeding, and on the price you realize for your berries when you market them.

A good rule of thumb might be to plan on spending two to four hours per week per acre on hand weeding a regularly weeded field—a field you’re bringing into production may require considerably more effort. If you can’t suppress weeds sufficiently in that two to four hours per week per acre, you may want to consider mowing or weed-whacking the parts of the field that are too weedy. An especially effective technique may be to sickle mow, either by tractor or by hand-held device, the weedy area just above blueberry canopy height (at that same three-times per season schedule) so that the weeds are suppressed while the blueberries are allowed to flourish. You’ll probably have to wait to harvest that area until the succeeding cycle, but it may be worth it to you if it brings more of your field into production.
A Year in the Life of a Blueberry Grower

*Deep winter*—make nesting boxes for bees, repair equipment, contract for honey bee hives or bumble bee quads, maintain field edges (overhanging tree removal) find work off the farm, if necessary, and meetings—on and off the farm!

*April*—field mowing (if you didn’t get it done in the fall), field burning, spread sulfur

*May*—set out bees, spread sulfur, begin weeding

*June*—first removal of saplings and herbaceous weeds

*July*—second removal of saplings and herbaceous weeds; third removal of saplings and herbaceous weeds

*August*—harvest!

*September*—continue harvest, clean up fields (of left over boxes, grass and weed piles, lane string)

*October*—begin mowing (flail or sickle) as soon as leaf drop has begun, spread straw, spread sulfur

A Guide to Transitioning at a Glance

1. Assess whether your land is suitable for organic blueberry management.
2. Assess whether you’re likely to manage it well.
3. Learn your field’s chemical history.
4. Join that dynamic organic blueberry community!—seek out other blueberry growers, government agents, university researchers and field agents, and the expertise of your organic certifier.
5. Gather and send off soil samples for pH determination.
7. Map field and develop management priorities.
8. Work up a strategy to encourage native pollinators.
9. Work up a harvesting method.
10. Work up a marketing strategy and line up markets.
The Weather You Wish For

When you cross your fingers and wish for the perfect weather to help your blueberry crop along, what weather should you wish for?

A snowy winter starts the year off well because a deep snow cover protects the overwintering blueberry buds from desiccating winter winds.

A slow, early spring thaw helps hold onto the snow longer, thus protecting the swelling buds from the occasional cold snap in early March.

A mild, late spring is crucial to protecting the emerging blossoms from frost.

A sunny, calm late spring gets the bees out of their hives and onto pollinating the blossoms.

A coolish summer with regular rain will let the fruit develop slowly and attain good size.

A mild, fairly dry August will keep the berries in good shape on the stems and allow the rakers to get the crop in.

An occasionally dry late-September through November will allow for the spreading of straw and perhaps for some fall burning and mowing, though regular moisture is important for the developing leaf and fruit buds as well.

Resources List

The Natural Resources Conversation Service, which offers technical support and cost-share programs, can be reached at:
http://www.nrcs.usda.gov/wps/portal/nrcs/site/me/home/

The many excellent publications of the University of Maine Cooperative Extension Service can be accessed at: http://umaine.edu/blueberries/. Especially see their research report on organic blueberry production:

To get on the university’s Wild Blueberry Newsletter mailing list, contact: phoebe.nylund@maine.edu. The newsletter is the best place to learn of the schedule of the annual blueberry meetings and of much else besides.

The Maine Organic Farmers and Gardeners Association, MOFGA, is the most commonly used organic certifier in Maine. Their certification division can be accessed at: http://www.mofgacertification.org/ Katy Green is a MOFGA staff member who
works helping prospective organic growers transition to organic production. She can be reached at: kgreen@mofga.org

If you plan to use any sort of EPA-registered chemical on your fields, which includes chemicals listed for organic use, you’ll need a Pesticide Applicator License from the Maine Board of Pesticides Control. The board frequently offers applicator exam training. To learn more about the license and of training opportunities, contact: Gary.Fish@maine.gov

Merrill’s Blueberry Farms is a family-owned and run blueberry grower and packer that is certified to produce IQF organic blueberries. This is a good place to bring your field berries if you don’t have your own processing capacity or markets.

The University of Maine Analytical Lab is your resource for soil and leaf tissue samples. Contact them for containers, forms, and instructions: http://anlab.umesci.maine.edu/

For a list of amendments and other substances you may use in organic agriculture, see: http://www.omri.org/omri-lists

For fresh-pack equipment and a really good walk-behind harvester, contact: Zane Emerson, Maine Blueberry Equipment, (207) 483-4156.

For results of research on organic wild blueberry production at the Maine Coast Heritage Trust’s Bog Brook Cove Preserve, see 2012 and 2013 Overview MCHT Bog Brook Cove Preserve blueberry research and management, available by contacting Melissa Lee, MCHT Regional Steward, mlee@mcht.org, or (207) 259-5041.

Pesticides and the Organic Blueberry Grower

There are a few pests of the organic blueberry field—thrips, the blueberry fruit fly maggot, spotted-wing drosophila, among the most vexing—that will tempt you toward some sort of chemical control. The organic farmer’s arsenal is small but effective, and includes extracts from flowers and soil micro-organisms. Bear in mind, though, that whenever you eliminate one pest, you eliminate many beneficial insects along with it. You change the balance of life in your field in ways that are impossible to predict and that may cause more harm than good.

When you spray Pyganic to suppress the blueberry maggot, for example, you may also destroy the bumble bee alighting on the golden rod that would have pollinated your next blueberry crop, or the damsel fly that is foraging for the mosquitoes that
might otherwise have brought you Eastern Equine Encephalitis or West Nile Virus. You may decimate countless other insects whose benefit to you may be unknown but which by their very presence play some crucial role in the ecology of the field where you also manage blueberries.

If you do choose to spray chemicals on your blueberry field, you will need a private pesticide applicator’s license from the Maine Board of Pesticide Control. There’s a short course to take and an exam to pass, and it’s all to the good, because the spraying of any chemical into the natural world should be done with great care and, to the extent possible, certain knowledge.

The Maine Board of Pesticide Control, in their zeal to encourage the wise and reluctant use of chemicals, is fond of lumping together organic and synthetic chemicals together into one broad category, but surely this is misleading. Naturally occurring chemical compounds—the pyrethrum extracted from the chrysanthemum flower, for example—are to synthetic chemicals what open-pollinated plants are to GMO: the natural world is accustomed to accommodating the former but has little defense against the latter—that’s why synthetic chemicals tend to be more environmentally persistent and harmful, is in fact why they work so well, why they’re made.

Most of all, remember that when you venture out onto your field with the intention of killing things, the effects are sure to be unpleasant for more than just the insect pest you would eliminate whatever kind of chemical you use; educate yourself and proceed with caution. Consider, too, whether your efforts might be better directed toward improving your yields, toward growing enough berries to share with the insects and other fauna you don’t like as well as the ones you do.

You’ll probably find that the more expert you become as an organic grower, the fewer occasions will arise where you’ll be tempted to reach for chemicals. If you know when to expect the arrival of the spotted wing drosophila, for example, you’ll know how early to harvest to avoid its depredations—get your berries in on time and you needn’t worry about controlling that particular pest. If you know where the blueberry fruit flies are likely to enter your field, you’ll know where to delay the harvest to allow the maggoty berries to fall from the stems before you rake. This development of expertise, this acquiring of deep, site-specific knowledge, is really just part of becoming better integrated into the ecological assemblage that is your blueberry field, it’s what all the other organisms there are doing as they adapt to the world that is their home.
Two Lines of Evidence in Favor of Promoting Native Pollinators

As if climate change weren’t enough to worry about, as a blueberry grower (or perhaps as just another citizen of the planet) you must also worry over the great decline in pollinators. Managed honey bee hives are suffering losses to a poorly understood phenomenon called colony collapse disorder, and the number of bumble bee species is declining precipitously throughout much of the world, as is the population of all native pollinators everywhere except Antarctica.

In addition to whatever political action you might undertake to encourage better regulation of chemicals known to be particularly harmful to pollinators, principally the neonicotinoid insecticides, you should certainly do all you can to make your blueberry field hospitable to native pollinators—and not just to benefit the planet: encouraging native pollinators will also improve your bottom line.

Evidence for this assertion comes from two sources.

In the first, Michigan State University researchers Rufus Issacs and Brett Blaauw, writing in the Journal of Applied Ecology, report that when they planted marginal lands adjacent to cultivated blueberry fields in Michigan with a mix of 15 native perennial wildflowers, the number of native pollinators doubled within three years, which led to a 10 to 20% improvement in blueberry yield.

And closer to home, the University of Maine’s entomologist Frank Drummond’s work with native pollinators reveals that native pollinator populations increase in the years following the installation of nesting boxes. These native pollinators are, according to Dr. Drummond, two to three times more effective than honey bees as pollinators. They also work in weather conditions that leave honey bees staying in the hive.

For further information on native pollinators in our area, consult the many resources of The Xerces Society for Invertebrate Conservation (http://www.xerces.org/pollinators-northeast-region/), Maine Wild Blueberry Fact Sheet No. 630, Wild Bee Conservation for Wild Blueberry Fields (http://umaine.edu/blueberries/factsheets/bees/630-wild-bee-conservation-for-wild-blueberry-fields/); for how to construct and set out nesting boxes, consult the University of Maine Wild Blueberry Fact Sheet No. 301, Field Conservation Management of Native Leafcutting and Mason Osmia Bees (http://umaine.edu/blueberries/factsheets/bees/301-field-conservation-management-of-native-leafcutting-and-mason-osmia-bees/)
The Organic Blueberry Field as Ecological Refuge: Island versus Countryside Biogeography

Theoretical and field research in the ecological study of island biogeography over the last 50 years serves as the foundation for models predicting extinction rates and ecological risk, and those predictions are dire: up to half the earth’s plants and animals are expected to go extinct over the next century. New research on mainland habitats analogous to actual islands surrounded by water suggest such predictions are too pessimistic. Chase Mendenhall, Daniel Karp and others from Stanford University studied bats in agricultural areas of Costa Rica and on islands with fragmented forests within a large man-made lake in Panama. They report in the April 16, 2014 issue of Nature that while island biogeographical theory well predicted species loss on the islands, it didn’t come close in the Costa Rican fragmented forest analog—coffee plantations interspersed among forest fragments supported many more bat species than island biogeography theory predicted. These fragmented countrysides require a new theoretical underpinning for predicting the ecological effects of human modifications to the landscape. Called countryside biogeography, the new theory offers great news for the aspiring farmer, especially the organic farmer. As the landscape is increasingly carved up for agriculture to feed an ever increasing population, the importance of that agricultural land for preserving species diversity will grow as well. And the ecologically richer that land is, the greater is the species diversity preserved. The great value your blueberry land may offer in producing a crop may be exceeded by its role in preserving the planet.
Return on Investment—Doing Well by Doing Good

There’ll likely come a day when the press of financial worry sets you to wondering whether organic agriculture is worth it. By growing your berries organically, are you improving the planet at the expense of your family? Put another way the question might be: are you also doing well by doing good?

Let’s get at that question by comparing three management scenarios and their results from the 2014 crop year—a bumper harvest of over 104 million pounds. These are actual numbers from two organic growers and one conventional grower, none of whom irrigated their fields. Considered here are cash outlays and returns (and not the many other costs the grower is shouldering—land ownership or lease cost, debt service, maintenance & repair, transportation, and many more besides). The costs are for the two-year crop cycle for burned fields—oil burned on the conventional, straw on the intensive managed organic, and free-burned on the passively managed field.

10-Acre Conventional Blueberry Field

Costs, per acre over two-year cycle:

- sulfur + fertilizer: .................................................................$250
- oil burning: .................................................................$700
- pesticides: .................................................................$250
- bees: ..............................................................................$200
- harvesting: (4,000 lbs/acre; $.25 per pound for hand-raked): ....$1,000

Total cost per acre for two-year crop cycle: .................................................$2,400

Returns

If sold to a large processor (preliminary average):

4,000 lbs/acre @ $.65 per lb: ..................................................$2,600

Net return = .................................................................$200 per acre

10-Acre Intensively Managed Organic Blueberry Field

Costs, per acre over two-year cycle:

- sulfur: .................................................................$200
- straw burning: .................................................................$200
- weeding (4 hours per acre per week; 8 weeks; $10 per hour): ......$320
- bees: ..............................................................................$200
- harvesting: (3,600 lbs/acre; $.35 per pound for hand-raked): ....$1,260

Total cost per acre for two-year crop cycle: ...............................................$2,180
Returns

Sold to a Merrill’s Blueberry Farms (preliminary price):
3,600 lbs/acre @ $1.42 per lb: ...............................................................$5,112

Net return = .................................................................................................$2,932 per acre

10-Acre Passively Managed Organic Blueberry Field

Costs, per acre over two-year cycle:
harvesting: (500 lbs/acre; $.50 per pound for hand-raked): .................$250

Total cost per acre for two-year crop cycle: ..............................................$250

Returns

Sold to a Merrill’s Blueberry Farms (preliminary price):
500 lbs/acre @ $1.42 per lb: .................................................................$710

Net return = ..................................................................................................$460 per acre

Clearly the best return in 2014 went to the organic grower who intensively managed her field. The differences aren’t always so dramatic—a bumper crop lowers the conventional field price much more than the organic (so far, with so little organic acreage in production) and this heightened the difference in returns for 2014. 3,600 pounds per acre is an unusually good crop for an organic grower, too; 2,000 is a more reasonable expectation, but even then the organic grower who intensively manages would have done best.

The passive organic grower still did better than the conventional grower, but not nearly as well as she could have done had she used sound management techniques such as are alluded to here and explained in detail in the many fine publications of the University of Maine’s Cooperative Extension Service.
To Pack or Not to Pack

Many organic growers pack their own crop on a fresh-pack line, and a cursory glance at the prices they get—$3 per pint or more—make it seem well worthwhile. Let’s compare the returns for two scenarios—packing your berries on a fresh-pack line, or selling organic berries to Merrill’s Blueberry Farms—to see if it is.

Packing your crop

Let’s say you own your fresh-pack line outright and thus have no debt to service. You pack 120 pints per hour, employ 5 people to run the line at that speed, to each of whom you pay $10 per hour, and sell your pints for $3 each. You pay out about $.20 per pint for packaging. What have you made per pound?

First, realize that you’ll lose 30% off your line as leaves, small berries, and clumps. So, every pound of berries you sell from that line is actually 1.3 pounds of field berries. Most growers do not have a reliable market for the 30% lost from the line.

A pint of berries is about 14 ounces, or .875 pounds, which requires (according to the 1.3 to 1 ratio of field pounds to packed pounds), 1.14 pounds.

So, that 120 pints uses 137 pounds of berries.

The costs for 120 pints are:

- packaging: $24
- labor: $50
- berries: 137 pounds

Leaving aside the cost of the berries, the cost of packing them is $74 for 120 pints. If you sell the pints for $3 each, your gross return is $360 for the 120 pints; your net return (aside from the cost of the berries) is thus $286. The return per pound (for the 137 pounds) is thus: $2.09

Selling your crop to the processor

A reasonable average price from an organic processor such as Merrill’s is $1.50 per pound.

It’s clear, then, that packing your own crop (given the assumptions here) gains you $.59 per pound. If you use family labor (assuming it’s not labor paid directly with cash), your gain will be even greater.

Of course, you should consider the cost of the fresh-pack line in your calculations. Perhaps two more considerations are even more crucial: whether you can find markets for your packed berries, and whether you have time to pack the crop you’re already busy harvesting.